DIGITAL

IDENTIFICATION

PRODUCT CODE:	MAINDEC-11-DZDLB-A-D
PRODUCT NAME:	DL11-E ON LINE TESTS
DATE CREATED:	JUNE 1,1972
MAINTAINER:	DIAGNOSTIC GROUP
AUTHOR:	ROBERT WHITTON

COPYRIGHT © 1972
DIGITAL EQUIPMENT CORPORATION

1. ABSTRACT

TWO SEPARATE DIAGNOSTIC PROGRAMS ARE PROVIDED FOR THE DL11-E (ASYNCRONOUS LINE INTERFACE), MAINDEC-11-DZDLA (DL11-E OFF LINE TESTS) AND MAINDEC-11-DZDLBA (DL11-E ON LINE TESTS). THE OFF LINE TESTS TEST ALL DL11-E LOGIC AND MAY BE USED TO INDIVIDUALLY TEST UP TO 31 DL11-E'S. THE OFF LINE TESTS DO NOT REQUIRE THE USE OF A MODEM, HOWEVER A SPECIAL JUMPER CONNECTOR IS REQUIRED. THE ON LINE TESTS ARE ESSENTIALLY DATA RELIABILITY TESTS RE-QUIRING THE USE OF MODEMS AND A SUITABLE TERMINAL DEVICE.

THREE STARTING ADDRESSES ARE PROVIDED. THEY ARE:

200 - NORMAL START
204 - REMAP DEVICES PRESENT AND RESTART
210 - MODIFY DEVICE ADDRESSES IF NON STANDARD
INSTRUCTIONS TO DO THIS ARE TYPED OUT.

THIS DOCUMENT DESCRIBES THE ON LINE TESTS.

THE AVAILABLE TESTS ARE:

PRG0	SINGLE CHARACTER LINE MODE DATA TEST
PRG1	BINARY COUNT LINE MODE DATA TEST
PRG2	MESSAGE TRANSMIT ONLY W/W/O PARITY
PRG3	RECEIVE DATA TEST
PRG4	MESSAGE TRANSMIT (SPIRAL) ONLY W/W/O PARITY.

2. REQUIREMENTS

2.1 EQUIPMENT

A. PDP 11 SYSTEM

B. DL11-E(S)

C. SUITABLE TERMINAL DEVICE (ASR 33, 37, DATA POINT, ETC)

D. MODEM TYPE 103 OR 202 OR EQUIVILENT

2.2 STORAGE

THIS PROGRAM USES ALL OF CORE (4K) EXCEPT THAT AREA RESERVED FOR THE BOOTSTRAP AND ABSOLUTE LOADERS.

3. OPERATING PROCEDURE:

3.1 LOADING PROCEDURE

THE ABSOLUTE LOADER IS USED TO LOAD THE PROGRAM.

3.2 DL11-E PARAMETER SELECTION

THE SELECTABLE DL11-E PARAMETERS ARE:

SW1-0 CHARACTER LENGTH

SW1	SW0	CHAR. LENGTH
0	0	8
0	1	7
1	0	6
1	1	5

WHEN A TERMINAL IS INVOLVED DL11-E PARAMETERS SHOULD BE SET ACCORDING TO TERMINAL SPECIFICATIONS.

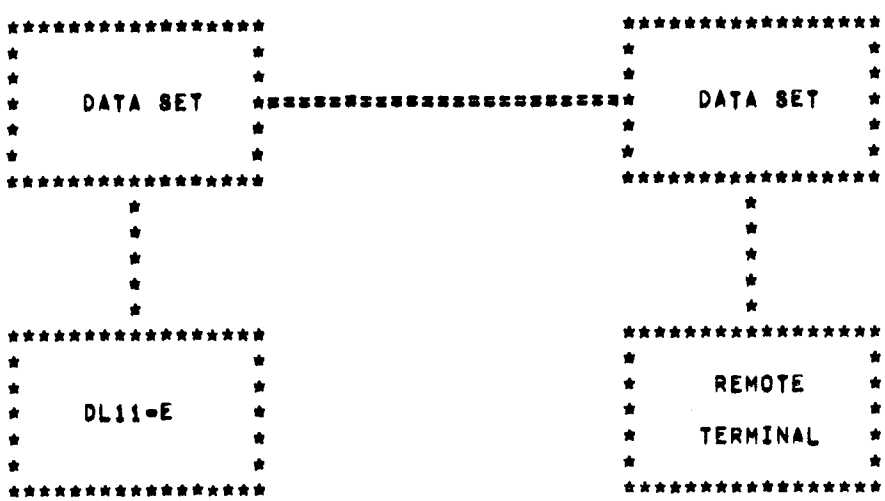
3.3 PDP-11 STANDARD OPERATING PARAMETERS

SW15	1 OR UP	HALT ON ERROR
SW14	1 OR UP	SCOPE LOOP (NOT USED)
SW13	1 OR UP	INHIBIT ERROR PRINTOUT
SW12	1 OR UP	INHIBIT TRACE TRAP (NOT USED)
SW11	1 OR UP	INHIBIT ITERATION (NOT USED)

3.4 GENERAL

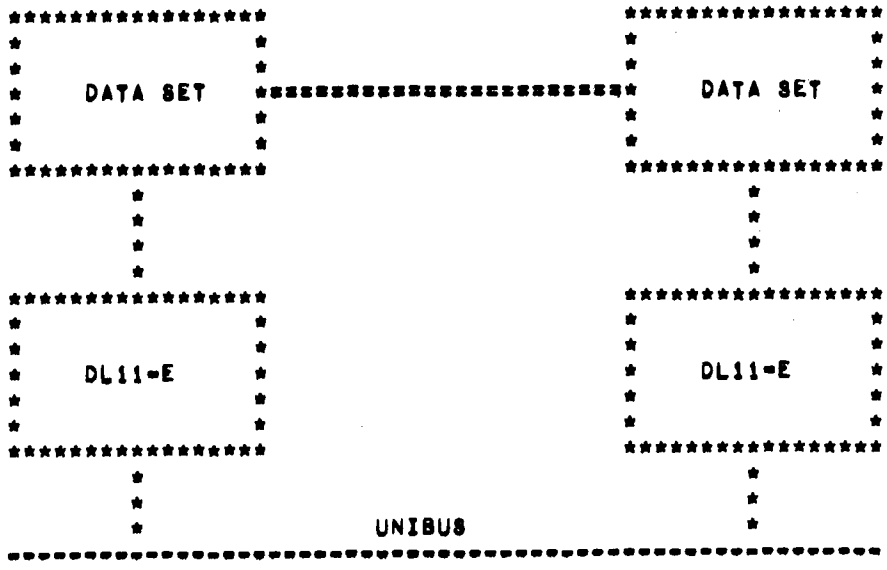
THERE ARE THREE CONFIGURATIONS USING DL11-E/MODEM PAIRS WHICH MAY BE SELECTED BY PRG0 AND PRG1. THESE CONFIGURATIONS ARE SELECTED BY THE USER WHEN REQUESTED BY THE PROGRAM DURING THE LINE CONNECTION ROUTINE.
THE FOLLOWING PROCEEDURES SHOULD BE FOLLOWED TO SELECT ANY OF THE THREE SELECTABLE CONFIGURATIONS:

CONFIGURATION 0: THIS CONFIGURATION TRANSMITS DATA FROM THE DL11-E CONNECTED TO THE LINE THAT WAS CALLED TO THE MODEM THAT CALLED (THE CALLER). THIS CONFIGURATION MAY BE USED TO TRANSMIT DATA TO A TERMINAL DEVICE. NOTE NO DATA CHECKING IS PERFORMED BY THE PROGRAM,HOWEVER,DATA MAY BE VISUALLY CHECKED AT THE TERMINAL DEVICE. TO INITIATE PROGRAM ACTION CALL THE MODEM CONNECTED TO A DL11-E FROM A MODEM CONNECTED TO THE TERMINAL DEVICE. WHEN THE PHONE RINGS AT THE PDP11 THE PROGRAM WILL REQUEST THE CONFIGURATION, SET SR0-1=00 AND PRESS CONTINUE. WHEN THE 'HANDSHAKING' IS COMPLETED THE PROGRAM WILL REQUEST DL11-E PARAMETERS LOAD THE PARAMETERS AS REQUESTED AND PRESS CONTINUE. THE PROGRAM WILL TYPE 'LINE CONNECTION MADE' AND BEGIN DATA TRANSMISSION.



CONFIGURATION 0

CONFIGURATION 1: THIS CONFIGURATION TRANSMITS DATA FROM THE DL11-E CONNECTED TO THE LINE THAT WAS CALLED TO THE DL11-E CONNECTED TO THE LINE THAT CALLED (THE CALLER). TO INITIATATE PROGRAM ACTION CALL THE DL11-E YOU WISH TO TRANSMIT ON FROM THE LINE CONNECTED TO THE DL11-E RECEIVER YOU WISH TO RECEIVE THE DATA ON. WHEN THE PHONE RINGS AT THE PDP11 THE PROGRAM WILL REQUEST THE CONFIGURATION AND MODEM TYPE. SET SR0-1=01 & SR2=0 IF A 103 (OR EQUIV.) AND SR2=1 IF A 202 (OR EQUIV.) PRESS CONTINUE. THE PROGRAM WILL REQUEST THE LINE NUMBER THAT YOU CALLED FROM. ENTER THIS INTO THE SR AND PRESS CONTINUE. WHEN THE CARRIER IS HEARD IN THE HEADSET PRESS THE DATA BUTTON ON THE DATA SET. YOU HAVE APPROXIMATLY 10 SECONDS IN WHICH TO DO THIS. WHEN THE 'HANDSHAKING' IS COMPLETED THE PROGRAM WILL REQUEST DL11-E PARAMETERS. LOAD THE PARAMETERS AS REQUESTED AND PRESS CONTINUE. THE PROGRAM WILL TYPE 'LINE CONNECTION MADE' AND BEGIN DATA TRANSMISSION. WHEN 100. CHARACTERS HAVE BEEN PROCESSED (TRANSMITTED/RECEIVED AND CHECKED) THE BELL WILL RING AT THE TTY, AND ANOTHER 100. CHARACTER BLOCK WILL BE PROCESSED.
NOTE, DL11-E#X REFERS TO THE 'CALLED' DL11-E, AND DL11-E#Y REFERS TO THE CALLING DL11-E.



CONFIGURATION 1 103 OR 202
CONFIGURATION 2 103 ONLY

CONFIGURATION 2: THIS CONFIGURATION TRANSMITS DATA FROM BOTH THE CALLED TRANSMITTER AND THE TRANSMITTER CONNECTED TO THE LINE THAT WAS CALLING,I.E. IN ADDITION TO THE DATA TRANSMITTED AS IN CONFIGURATION 1 DATA IS ALSO TRANSMITTED IN THE REVERSE DIRECTION. TO INITIATE PROGRAM ACTION CALL THE DL11-E YOU WISH TO TRANSMIT ON FROM THE DL11-E YOU WISH TO RECEIVE/TRANSMIT ON. WHEN THE PHONE RINGS AT THE PDP11 THE PROGRAM WILL REQUEST THE CONFIGURATION AND MODEM TYPE. SET SR0-1 =10 AND SR2=0. NOTE: ********DO NOT USE MODEM TYPE 202 (OR EQUIV) USING CONFIG #2**** THE PROGRAM WILL REQUEST THE LINE YOU CALLED FROM,ENTER THE LINE NUMBER INTO THE SR AND PRESS CONTINUE. WHEN THE CARRIER IS HEARD IN THE HEADSET PRESS THE DATA BUTTON ON THE DATA SET. NOTE YOU HAVE APPROXIMATLY 10 SECONDS IN WHICH TO DO THIS. WHEN THE 'HANDSHAKING IS COMPLETED THE PROGRAM WILL REQUEST TWO SETS OF DL11-E PARAMETERS, THE CHARACTER LENGTH OF BOTH SETS MUST BE THE SAME AND THE SPEED OF THE SECOND SET MUST BE GREATER THAN THE SPEED OF THE FIRST. WHEN THE PARAMETERS HAVE BEEN LOADED THE PROGRAM WILL TYPE 'LINE CONNECTION MADE' AND BEGIN TO WAY DATA TRANSMISSION. WHEN 100. CHARACTERS HAVE BEEN RECEIVED AND CHECKED THE BELL WILL RING AT THE TTY, AND ANOTHER BLOCK OF 100. CHARACTERS WILL BE PROCESSED.
NOTE, DL11-E#X REFERS TO THE 'CALLED' DL11-E, AND DL11-E#Y REFERS TO THE 'CALLING' DL11-E.

3.5 LINE NUMBERS

LINE NUMBER REFERS TO THE ADDRESSES TO WHICH THE DL11-E RESPONDS.

LINE 00 77561X	LINE 10 77571X	LINE 20 77601X	LINE 30 77611X
LINE 01 77562X	LINE 11 77572X	LINE 21 77602X	LINE 31 77612X
LINE 02 77563X	LINE 12 77573X	LINE 22 77603X	LINE 32 77613X
LINE 03 77564X	LINE 13 77574X	LINE 23 77604X	LINE 33 77614X
LINE 04 77565X	LINE 14 77575X	LINE 24 77605X	LINE 34 77615X
LINE 05 77566X	LINE 15 77576X	LINE 25 77606X	LINE 35 77616X
LINE 06 77567X	LINE 16 77577X	LINE 26 77607X	LINE 36 77617X
LINE 07 77570X	LINE 17 77600X	LINE 27 77610X	

4. USE PROCEDURE

4.1 PRG0 SINGLE CHARACTER LINE MODE DATA TEST

A. LOAD ADDRESS = 000200 (RESTART LOAD ADDR. = 000200)

B. START = PROGRAM WILL REQUEST PROGRAM NUMBER

C. THE PROGRAM WILL NOW REQUEST THE DATA. LOAD DATA INTO SR 0-7 AND PRESS CONTINUE.

D. MAKE LINE CONNECTION. SEE SECT 3.4

4.2 PRG1 = BINARY COUNT LINE MODE DATA TEST

A. LOAD ADDRESS = 000200

B. START = PROGRAM WILL REQUEST PROGRAM NUMBER

C. MAKE LINE CONNECTION SEE SECT 3.4

4.3 PRG2 = SPECIAL MESSAGE XMIT ONLY

A. LOAD ADDRESS = 000200

B. START = PROGRAM WILL REQUEST PROGRAM NUMBER

C. DEPRESS START = THE PROGRAM WILL IDENTIFY ITSELF AND TYPE INSTRUCTIONS TO SELECT DESIRED DL11-E PARAMETERS

(SEE SECT 3.2)

D. SET IN PARAMETERS IF IT IS DESIRED TO TRANSMIT DATA WITH PARITY RAISE SR6, ALSO RAISE SR5 TO TRANSMIT ODD PARITY AND LOWER TO TRANSMIT EVEN PARITY.

```
        SR6     UP/DWN  ENABLE/DISABLE PARITY
        SR5     UP/DWN  TRANSMIT ODD/EVEN PARITY
PRESS CONTINUE
```

E. WHEN 'MAKE LINE CONNECTION ' IS TYPED CALL THE DL11-E YOU WISH TO TRANSMIT ON FROM THE TERMINAL MODEM. WHEN THE 'HANDSHAKING' IS COMPLETED THE MESSAGE 'THE QUICK BROWN FOX JUMPED OVER THE LAZY DOGS BACK 0123456789' WILL BE TRANSMITTED. TO TERMINATE HANG UP.

4.4 PRG3 - RECEIVE TRANSMIT MESSAGE TEST

A. LOAD ADDRESS = 000200

B. START - PROGRAM WILL REQUEST PROGRAM NUMBER

C. DEPRESS START - THE PROGRAM WILL IDENTIFY ITSELF AND TYPE INSTRUCTIONS TO SELECT DESIRED OPTIONS.

D. SET IN OPTIONS AND PRESS CONTINUE.

E. WHEN 'MAKE LINE CONNECTION' IS TYPED CALL THE DL11-E YOU WISH TO TRANSMIT ON, WHEN THE 'HANDSHAKING' IS COMPLETED THE DL11-E WILL TRANSMIT A CRLF TO THE TERMINAL DEVICE. AT THIS TIME YOU MAY BEGIN TO SEND DATA FROM THE DEVICE TO THE DL11-E WHERE IT WILL BE ECHOED BACK TO THE TERMINAL. TYPE ANY CHARACTER TO SIGNAL START OF MESSAGE, THEN TYPE MESSAGE AND THE SAME CHARACTER TO SIGNAL END OF MESSAGE, CONTROL C WILL CAUSE THE BUFFERS CONTENTS TO BE TRANSMITTED WHEN TYPED.

F. IF NO ECHO IS DESIRED (ON A CHARACTER BASIS FOR EXAMPLE WHEN USING A TERMINAL THAT PRODUCES ITS OWN LOCAL COPY) RAISE SR7.

4.5 PRG4 - SPECIAL MESSAGE XMIT ONLY

A. LOAD ADDRESS = 000200

B. SWITCH REGISTER
   1. SR 0-2 = 4
   2. SR 3-6 = LINE NUMBER (SEE SECT 3.5)

C. DEPRESS START - THE PROGRAM WILL IDENTIFY ITSELF AND TYPE INSTRUCTIONS TO SELECT DESIRED DL11-E PARAMETERS

   (SEE SECT 3.2)

D. SET IN PARAMETERS IF IT IS DESIRED TO TRANSMIT DATA WITH PARITY RAISE SR6. ALSO RAISE SR5 TO TRANSMIT ODD PARITY AND LOWER TO TRANSMIT EVEN PARITY.

SR6	UP/DWN	ENABLE/DISABLE PARITY
SR5	UP/DWN	TRANSMIT ODD/EVEN PARITY

E. WHEN 'MAKE LINE CONNECTION ' IS TYPED CALL THE DL11-E YOU WISH TO TRANSMIT ON FROM THE TERMINAL MODEM. WHEN THE 'HANDSHAKING' IS COMPLETED A SPIRAL PATTERN WILL BE TRANSMITTED, TO TERMINATE HANG UP.

5. PROGRAM DESCRIPTIONS

5.1 PRG0 - SINGLE CHARACTER LINE MODE DATA TEST

PRG0 TRANSMITS USER SPECIFIED DATA AND A CARRIAGE RETURN/LINE FEED EVERY 72ND CHARACTER.

5.2 PRG1 - BINARY COUNT PATTERN LINE MODE DATA TEST

PRG1 TRANSMITS A BINARY COUNT PATTERN. THIS PROGRAM IS THE SAME AS PRG0 EXCEPT FOR THE DATA TRANSMITTED.

5.3 PRG2 - SPECIAL MESSAGE TRANSMIT ONLY

PRG2 TRANSMITS THE MESSAGE
THE QUICK BROWN FOX JUMPED OVER THE LAZY DOGS BACK 0123456789.
NO DATA ERROR CHECKING IS PERFORMED BY THE PROGRAM.

5.4 PRG3 - RECEIVE/TRANSMIT MESSAGE TEST

PRG3 - RECEIVES DATA FROM A TERMINAL AND READS THE RECEIVED MESSAGE BACK, AND TYPES THE MESSAGE ON THE PDP-11 TTY WHEN THE MESSAGE IS TERMINATED. CHARACTERS MAY BE ECHOED BACK (IF REQUIRED) ON A CHARACTER BASIS THEREBY CREATING LOCAL COPY AS THE MESSAGE IS TYPED.
TRANSMISSION MAY BEGIN AT THE TERMINAL WHEN A CR/LF IS RECEIVED AT THE TERMINAL. THIS PROGRAM IS RESTRICTED TO USE BY ONLY FULL DUPLEX MODEMS.

5.5 PRG4 - SPECIAL MESSAGE TRANSMIT ONLY

PRG4 TRANSMITS A SPIRAL PATTERN.
NO DATA CHECKING IS PERFORMED BY THE PROGRAM.

6.0 ERRORS

THERE ARE TWO TYPES OF ERRORS WHICH ARE DETECTED BY THESE TESTS LINE FAILURE,AND DATA ERRORS.
LINE FAILURES ARE DETECTED AND REPORTED BY ALL TESTS, AND DATA ERRORS ARE DETECTED ONLY IN PRG 0 &1 WHEN USING CONFIGURATIONS 1 OR 2. DATA ERRORS IN THE OTHER TESTS MAY BE DETECTED BY VISUAL INSPECTION OF THE DATA AT THE TERMINAL.
LINE FAILURES ARE REPORTED BY TYPING THE PC,THE RECEIVER CONTROL STATUS REGISTER ADDRESS, AND ITS CONTENTS. SEE THE PROGRAM LISTING FOR A DETAILED DESCRIPTION OF THE ERROR.
THE MOST FREQUENTLY ENCOUNTERED ERROR WILL PROBABLY BE THE LOSS OF CARRIER. THIS ERROR WILL BE REPORTED IF AFTER A LINE CONNECTION IS MADE THE CARRIER IS LOST, EITHER BY 'HANGING UP' OR A 'GLITCH' ON THE LINE CAUSING THE CARRIER TO MOMENTARILY DROP. IN EITHER INSTANCE THE PROGRAM DISCONNECTS THE DL11-E FROM THE MODEM (BY CLEARING DATA TERMINAL READY) AND THE LINE WILL HAVE TO BE RECONNECTED TO RESUME TESTING.
IF IT IS PHYSICALLY IMPOSSIBLE TO GET TO THE DATA BUTTON WITHIN THE TIME ALLOTTED (APPROX. 10 SECONDS) TO MAKE THE LINE CONNECTION, THIS TIME MAY BE INCREASED BY PUTTING A LARGER NUMBER INTO THE DELAY. PATCH THE LARGER NUMBER INTO THE ADDRESS FOLLOWING THE DELAY EMT (BETWEEN RINTBG AND RINTBH),FOR EXAMPLE PATCHING IN 72460 WILL ALLOW APPROXIMATELY 30 SECONDS IN WHICH TO RESPOND.

DATA ERRORS ARE REPORTED BY TYPING THE PC, THE RECEIVER CONTROL REGISTER ADDRESS OF THE LINE THAT FAILED,WHAT THE DATA SHOULD HAVE BEEN,WHAT THE DATA WAS,AND THE CHARACTER NUMBER.

```
PC=XXXXXX 174010 DATA S/B 301 WAS 321 CHAR NO 23
```

THIS TYPEOUT INDICATES A DATA ERROR ON LINE 1
IF CONFIGURATION 2 IS SELECTED TWO ERROR TYPOUTS MAY OCCUR FOR A SINGLE ERROR DEPENDING ON WHERE THE ERROR OCCURED. CONFIGURATION 2 COMPARES THE DATA RECEIVED AT THE CALLED DL11-E WITH THE DATA TRANSMITTED BY THE CALLED DL11-E, AND ALSO THE DATA RECEIVED AT THE CALLING DL11-E (CALLER) WITH THE DATA TRANSMITTED BY THE CALLED DL11-E.
IF FOR EXAMPLE A DATA ERROR OCURRED AT THE RECEIVER OF THE CALLING DL11-E CAUSING IT TO TRANSMIT INCORRECT DATA TO THE CALLED DL11-E TWO TYPEOUTS WILL OCCUR AS SHOWN BELOW:

```
PC=XXXXXX 174010 DATA S/B 301 WAS 321 CHAR NO 23
PC=XXXXXX 174000 DATA S/B 301 WAS 321 CHAR NO 23
```

THESE TYPEOUTS SHOW THAT THE RECEIVER ON LINE 0 WAS THE CAUSE OF THE ERROR AND THE RECEIVER ON LINE 1 RECEIVED THE CORRECT INCORRECT DATA.

```
                        .ENDR
                        .TITLE  DZDLB3
                        .ABS
                ;THIS TEST CHECKS THE DL11-E USING MODEMS
                ;REFER ALSO TO TEST DZDLA (DL11-E OFF LINE TESTS)
                ;STARTING PROCEEDURE
                ;       LOAD ADDRESS 200
                ;       LOAD PROGRAM # INTO SR0-2
                ;
                ;       STACK POINTER IS AT 1200
                ;       PRESS START
                ;       REMAP=204
                ;       MODIFY=210
                ;
                ;AVAILABLE PROGRAMS
                ;       PRG0= SINGLE CHARACTER LINE MODE DATA TEST.
                ;       PRG1= SPECIAL BINARY COUNT LINE MODE DATA TEST.
                ;       PRG2= SPECIAL MESSAGE XMIT ONLY W/W/O PARITY
                ;       PRG3= RECEIVE DATA TEST
                ;       PRG4= SPIRAL PATTERN MESSAGE XMIT ONLY W/W/O PARITY
                ;       PRG5= DATA ECHO TEST (USES FACILITY AT MAYNARD)

                ;STANDARD SR SWITCH OPTIONS (SWITCH SET TO A 1 )
                ;SR15= HALT ON ERROR.
                ;SR14= SCOPE (NOT USED)
                ;SR13= INHIBIT PRINTOUT
                ;SR12= INHIBIT TRACE (NOT USED)
                ;SR11= INHIBIT ITERATION (NOT USED)
000000  000000          .=0
000000  004352          ERTP                    ;UNASSIGNED TRAP
000002  000000          0
000004  004352  MACHER: ERTP                    ;SP OVERFLOW, BUS ERROR TRAP
000006  000040          40
000010  004352          ERTP                    ;RESERVED INSTRUCTION TRAP
000012  000100          100
000014  004352          ERTP                    ;TRACE TRAP
000016  000140          140
000020  004460          MAPVEC                  ;TRAP TO MAP VECTOR
000022  000340          PRTY7
000024  002652          PFAIL                   ;POWER FAIL TRAP
000026  000340          PRTY7
000030  002226          EMTINT                  ;EMT TRAP
000032  000340          PRTY7
000034  004352          ERTP
000036  000340          340
000040  000042          .+2
000042  000000          HALT
                        .REPT   119.
                        .+2
                        4                       ;TRAP TO MAP MAKER
                        .ENDR
000044  000046          .+2
000046  000004          4                       ;TRAP TO MAP MAKER
000050  000052          .+2
000052  000004          4                       ;TRAP TO MAP MAKER
```

```
000054  000056                  .+2
000056  000004                  4               ;TRAP TO MAP MAKER
000060  000062                  .+2
000062  000004                  4               ;TRAP TO MAP MAKER
000064  000066                  .+2
000066  000004                  4               ;TRAP TO MAP MAKER
000070  000072                  .+2
000072  000004                  4               ;TRAP TO MAP MAKER
000074  000076                  .+2
000076  000004                  4               ;TRAP TO MAP MAKER
000100  000102                  .+2
000102  000004                  4               ;TRAP TO MAP MAKER
000104  000106                  .+2
000106  000004                  4               ;TRAP TO MAP MAKER
000110  000112                  .+2
000112  000004                  4               ;TRAP TO MAP MAKER
000114  000116                  .+2
000116  000004                  4               ;TRAP TO MAP MAKER
000120  000122                  .+2
000122  000004                  4               ;TRAP TO MAP MAKER
000124  000126                  .+2
000126  000004                  4               ;TRAP TO MAP MAKER
000130  000132                  .+2
000132  000004                  4               ;TRAP TO MAP MAKER
000134  000136                  .+2
000136  000004                  4               ;TRAP TO MAP MAKER
000140  000142                  .+2
000142  000004                  4               ;TRAP TO MAP MAKER
000144  000146                  .+2
000146  000004                  4               ;TRAP TO MAP MAKER
000150  000152                  .+2
000152  000004                  4               ;TRAP TO MAP MAKER
000154  000156                  .+2
000156  000004                  4               ;TRAP TO MAP MAKER
000160  000162                  .+2
000162  000004                  4               ;TRAP TO MAP MAKER
000164  000166                  .+2
000166  000004                  4               ;TRAP TO MAP MAKER
000170  000172                  .+2
000172  000004                  4               ;TRAP TO MAP MAKER
000174  000176                  .+2
000176  000004                  4               ;TRAP TO MAP MAKER
000200  000202                  .+2
000202  000004                  4               ;TRAP TO MAP MAKER
000204  000206                  .+2
000206  000004                  4               ;TRAP TO MAP MAKER
000210  000212                  .+2
000212  000004                  4               ;TRAP TO MAP MAKER
000214  000216                  .+2
000216  000004                  4               ;TRAP TO MAP MAKER
000220  000222                  .+2
000222  000004                  4               ;TRAP TO MAP MAKER
000224  000226                  .+2
000226  000004                  4               ;TRAP TO MAP MAKER
000230  000232                  .+2
```

```
000232  000004                  4                       ;TRAP TO MAP MAKER
000234  000236                  .+2
000236  000004                  4                       ;TRAP TO MAP MAKER
000240  000242                  .+2
000242  000004                  4                       ;TRAP TO MAP MAKER
000244  000246                  .+2
000246  000004                  4                       ;TRAP TO MAP MAKER
000250  000252                  .+2
000252  000004                  4                       ;TRAP TO MAP MAKER
000254  000256                  .+2
000256  000004                  4                       ;TRAP TO MAP MAKER
000260  000262                  .+2
000262  000004                  4                       ;TRAP TO MAP MAKER
000264  000266                  .+2
000266  000004                  4                       ;TRAP TO MAP MAKER
000270  000272                  .+2
000272  000004                  4                       ;TRAP TO MAP MAKER
000274  000276                  .+2
000276  000004                  4                       ;TRAP TO MAP MAKER
000300  000302                  .+2
000302  000004                  4                       ;TRAP TO MAP MAKER
000304  000306                  .+2
000306  000004                  4                       ;TRAP TO MAP MAKER
000310  000312                  .+2
000312  000004                  4                       ;TRAP TO MAP MAKER
000314  000316                  .+2
000316  000004                  4                       ;TRAP TO MAP MAKER
000320  000322                  .+2
000322  000004                  4                       ;TRAP TO MAP MAKER
000324  000326                  .+2
000326  000004                  4                       ;TRAP TO MAP MAKER
000330  000332                  .+2
000332  000004                  4                       ;TRAP TO MAP MAKER
000334  000336                  .+2
000336  000004                  4                       ;TRAP TO MAP MAKER
000340  000342                  .+2
000342  000004                  4                       ;TRAP TO MAP MAKER
000344  000346                  .+2
000346  000004                  4                       ;TRAP TO MAP MAKER
000350  000352                  .+2
000352  000004                  4                       ;TRAP TO MAP MAKER
000354  000356                  .+2
000356  000004                  4                       ;TRAP TO MAP MAKER
000360  000362                  .+2
000362  000004                  4                       ;TRAP TO MAP MAKER
000364  000366                  .+2
000366  000004                  4                       ;TRAP TO MAP MAKER
000370  000372                  .+2
000372  000004                  4                       ;TRAP TO MAP MAKER
000374  000376                  .+2
000376  000004                  4                       ;TRAP TO MAP MAKER
000400  000402                  .+2
000402  000004                  4                       ;TRAP TO MAP MAKER
000404  000406                  .+2
000406  000004                  4                       ;TRAP TO MAP MAKER
```

```
000410  000412                  .+2
000412  000004                  4                ;TRAP TO MAP MAKER
000414  000416                  .+2
000416  000004                  4                ;TRAP TO MAP MAKER
000420  000422                  .+2
000422  000004                  4                ;TRAP TO MAP MAKER
000424  000426                  .+2
000426  000004                  4                ;TRAP TO MAP MAKER
000430  000432                  .+2
000432  000004                  4                ;TRAP TO MAP MAKER
000434  000436                  .+2
000436  000004                  4                ;TRAP TO MAP MAKER
000440  000442                  .+2
000442  000004                  4                ;TRAP TO MAP MAKER
000444  000446                  .+2
000446  000004                  4                ;TRAP TO MAP MAKER
000450  000452                  .+2
000452  000004                  4                ;TRAP TO MAP MAKER
000454  000456                  .+2
000456  000004                  4                ;TRAP TO MAP MAKER
000460  000462                  .+2
000462  000004                  4                ;TRAP TO MAP MAKER
000464  000466                  .+2
000466  000004                  4                ;TRAP TO MAP MAKER
000470  000472                  .+2
000472  000004                  4                ;TRAP TO MAP MAKER
000474  000476                  .+2
000476  000004                  4                ;TRAP TO MAP MAKER
000500  000502                  .+2
000502  000004                  4                ;TRAP TO MAP MAKER
000504  000506                  .+2
000506  000004                  4                ;TRAP TO MAP MAKER
000510  000512                  .+2
000512  000004                  4                ;TRAP TO MAP MAKER
000514  000516                  .+2
000516  000004                  4                ;TRAP TO MAP MAKER
000520  000522                  .+2
000522  000004                  4                ;TRAP TO MAP MAKER
000524  000526                  .+2
000526  000004                  4                ;TRAP TO MAP MAKER
000530  000532                  .+2
000532  000004                  4                ;TRAP TO MAP MAKER
000534  000536                  .+2
000536  000004                  4                ;TRAP TO MAP MAKER
000540  000542                  .+2
000542  000004                  4                ;TRAP TO MAP MAKER
000544  000546                  .+2
000546  000004                  4                ;TRAP TO MAP MAKER
000550  000552                  .+2
000552  000004                  4                ;TRAP TO MAP MAKER
000554  000556                  .+2
000556  000004                  4                ;TRAP TO MAP MAKER
000560  000562                  .+2
000562  000004                  4                ;TRAP TO MAP MAKER
000564  000566                  .+2
```

```
000566  000004                  4                       ;TRAP TO MAP MAKER
000570  000572                  .+2
000572  000004                  4                       ;TRAP TO MAP MAKER
000574  000576                  .+2
000576  000004                  4                       ;TRAP TO MAP MAKER
000600  000602                  .+2
000602  000004                  4                       ;TRAP TO MAP MAKER
000604  000606                  .+2
000606  000004                  4                       ;TRAP TO MAP MAKER
000610  000612                  .+2
000612  000004                  4                       ;TRAP TO MAP MAKER
000614  000616                  .+2
000616  000004                  4                       ;TRAP TO MAP MAKER
000620  000622                  .+2
000622  000004                  4                       ;TRAP TO MAP MAKER
000624  000626                  .+2
000626  000004                  4                       ;TRAP TO MAP MAKER
000630  000632                  .+2
000632  000004                  4                       ;TRAP TO MAP MAKER
000634  000636                  .+2
000636  000004                  4                       ;TRAP TO MAP MAKER
000640  000642                  .+2
000642  000004                  4                       ;TRAP TO MAP MAKER
000644  000646                  .+2
000646  000004                  4                       ;TRAP TO MAP MAKER
000650  000652                  .+2
000652  000004                  4                       ;TRAP TO MAP MAKER
000654  000656                  .+2
000656  000004                  4                       ;TRAP TO MAP MAKER
000660  000662                  .+2
000662  000004                  4                       ;TRAP TO MAP MAKER
000664  000666                  .+2
000666  000004                  4                       ;TRAP TO MAP MAKER
000670  000672                  .+2
000672  000004                  4                       ;TRAP TO MAP MAKER
000674  000676                  .+2
000676  000004                  4                       ;TRAP TO MAP MAKER
000700  000702                  .+2
000702  000004                  4                       ;TRAP TO MAP MAKER
000704  000706                  .+2
000706  000004                  4                       ;TRAP TO MAP MAKER
000710  000712                  .+2
000712  000004                  4                       ;TRAP TO MAP MAKER
000714  000716                  .+2
000716  000004                  4                       ;TRAP TO MAP MAKER
000720  000722                  .+2
000722  000004                  4                       ;TRAP TO MAP MAKER
000724  000726                  .+2
000726  000004                  4                       ;TRAP TO MAP MAKER
000730  000732                  .+2
000732  000004                  4                       ;TRAP TO MAP MAKER
000734  000736                  .+2
000736  000004                  4                       ;TRAP TO MAP MAKER
000740  000742                  .+2
000742  000004                  4                       ;TRAP TO MAP MAKER
```

```
000744  000746                  .+2
000746  000004                  4       ;TRAP TO MAP MAKER
000750  000752                  .+2
000752  000004                  4       ;TRAP TO MAP MAKER
000754  000756                  .+2
000756  000004                  4       ;TRAP TO MAP MAKER
000760  000762                  .+2
000762  000004                  4       ;TRAP TO MAP MAKER
000764  000766                  .+2
000766  000004                  4       ;TRAP TO MAP MAKER
000770  000772                  .+2
000772  000004                  4       ;TRAP TO MAP MAKER
000774  000776                  .+2
000776  000004                  4       ;TRAP TO MAP MAKER
```

```
                        ;EQUATE STATEMENTS
177570                          SR=177570
177776                          PSW=177776
001200                          STKPTR=1200
000000                          OPEN=0
100000                          MANUAL=BIT15
100000                          BIT15=100000
040000                          BIT14=40000
020000                          BIT13=20000
010000                          BIT12=10000
004000                          BIT11=4000
002000                          BIT10=2000
001000                          BIT9=1000
000400                          BIT8=400
000200                          BIT7=200
000100                          BIT6=100
000040                          BIT5=40
000020                          BIT4=20
000010                          BIT3=10
000004                          BIT2=4
000002                          BIT1=2
000001                          BIT0=1
005726                          POPSP=5726              ;POP THE STACK, SAME AS TST (6)+
022626                          POPSP2=022626           ;POP STACK TWICE, SAME AS CMP (6)+,(6)+
000340                          PRTY7=340               ;PRIORITY LEVEL DEFINITIONS
000300                          PRTY6=300
000240                          PRTY5=240
000200                          PRTY4=200
000140                          PRTY3=140
000100                          PRTY2=100
000040                          PRTY1=40
000000                          PRTY0=0
104000                          TYPE=EMT+0
104001                          TYPES=EMT+1
104002                          STALL=EMT+2
104003                          ERROR=EMT+3
104004                          DATCHK=EMT+4
104005                          CHALT=EMT+5
104006                          STRXV=EMT+6
104007                          STTXV=EMT+7
104010                          EHALT=EMT+10
104011                          SAVREG=EMT+11
104012                          RSTREG=EMT+12
104013                          ERROR1=EMT+13
104014                          ERRTX=EMT+14
104015                          ERRRX=EMT+15
104016                          DELAY=EMT+16
000000                          N=0
000000                          A=0
```

```
                        .MACR   CNVOA   SRC,DST,COUNT
                        JSR     X5,OACNV        ;GO TO OCTAL TO ASCII CONVERT.
                        SRC                     ;SOURCE ADDR.
                        DST                     ;DESTINATION ADDR.
                        COUNT                   ;#OF DIGITS TO CONVERT.
                        .ENDM

                        .MACR   ISR     N
RISR'N':                MOV     #'N',X0
                        JMP     RISR            ;GO TO COMMON INTERRUPT SERVICE ROUTINE

                        .ENDM

                        .MACR   ISRT    N
TISR'N':                MOV     #'N',X0         ;PUT LINE # IN R0
                        JMP     TISR            ;GO TO COMMON INTERRUPT SERVICE

                        .ENDM

                        .MACR   RRCV    N,A
                        175610+N                ;ADDRESS OF RECEIVER LINE # 'A'
                        .ENDM

                        .MACR   RBUFF   N,A
                        175612+N                ;ADDRESS OF RECEIVER BUFFER LINE # 'A'
                        .ENDM

                        .MACR   TXMT    N,A
                        175614+N                ;ADDRESS OF TRANSMITTER CSR LINE # 'A'
                        .ENDM

                        .MACR   TBUFF   N,A
                        175616+N                ;ADDRESS OF TRANSMIT BUFFER LINE # 'A'
                        .ENDM
```

```
                000200                          .=200
000200  000167  001216                          JMP     START           ;GO TO START OF PROGRAM.
000204  000167  001206                          JMP     REMAP           ;REMAP
000210  000167  001610                          JMP     MODEV           ;MODIFY
                001200                          .=1200
001200  000000                  RXCSR:  0                               ;RECEIVER CSR UNDER TEST
001202  000000                  RXBUF:  0                               ;RECEIVER BUFFER UNDER TEST
001204  000000                  TXCSR:  0                               ;TRANSMITTER CSR UNDER TEST
001206  000000                  TXBUF:  0                               ;TRANSMITTER BUFFER UNDER TEST
001210  000000                  RXVTR:  OPEN                            ;RECEIVER VECTOR
001212  000200                  RXLVL:  PRTY4                           ;RECEIVER PRIORITY LEVEL
001214  000000                  TXVTR:  OPEN                            ;TRANSMITTER VECTOR
001216  000200                  TXLVL:  PRTY4                           ;TRANSMITTER PRIORITY LEVEL
001220  177560                  TKS:    177560                          ;LSR CSR
001222  177562                  TKB:    177562                          ;LSR BUFFER
001224  177564                  TPS:    177564                          ;LSP CSR
001226  177566                  TPB:    177566                          ;LSP BUFFER
001230  000060                  TKVTR:  60                              ;LSR INTERRUPT VECTOR
001232  000200                  TKLVL:  PRTY4                           ;LSR PRIORITY LEVEL
001234  000064                  TPVTR:  64                              ;LSP INTERRUPT VECTOR
001236  000200                  TPLVL:  PRTY4                           ;LSP PRIORITY LEVEL
001240  000000                  PRGNUM: OPEN                            ;CONTAINS CURRENT PROGRAM#
001242  000000                  PRGID:  OPEN                            ;CONTAINS PROGRAM INDICATORS
001244  006260                  PRGTAB: PRG0                            ;PRG0 START ADDRESS
001246  006374                          PRG1                            ;PRG1 START ADDRESS
001250  006476                          PRG2                            ;PRG2 START ADDRESS
001252  006574                          PRG3                            ;PRG3 START ADDRESS
001254  007330                          PRG4                            ;PRG4 START ADDRESS
001256  007542                          PRG5                            ;PRG5 START ADDRESS
001260  002360                          INCPRG
001262  002360                          INCPRG
001264  003126                  EMTTAB: TYP                             ;POINTER TO TYPEOUT ROUTINE
001266  003250                          TYPS                            ;POINTER TO CHAINED MESSAGES ROUTINE
001270  000000                          OPEN                            ;POINTER TO RANDOM STALL ROUTINE
001272  002516                          ERR                             ;POINTER TO ERROR ROUTINE
001274  002416                          DTCHK                           ;POINTER TO DATA CHECK ROUTINE
001276  002372                          CHLT                            ;COMMON HALT
001300  003046                          STRVRV                          ;POINTER TO ROUTINE TO SET RCVR VECTOR AND PRIORITY
001302  003076                          STXMTV                          ;POINTER TO ROUTINE TO SET XMIT VECTOR AND PRIORITY
001304  002404                          EHLT                            ;POINTER TO ERROR HALT ROUTINE.
001306  002260                          SAVRG                           ;POINTER TO SAVE REGISTERS ROUTINE
001310  002320                          RSTRG                           ;POINTER TO RESTORE REGISTERS ROUTINE
001312  002540                          ERR1                            ;POINTER TO ERROR ROUTINE
001314  002714                          TXERR                           ;POINTER TO XMIT ERROR ROUTINE
001316  002736                          RXERR                           ;POINTER TO RCVR ERROR ROUTINE
001320  003320                          DLY                             ;POINTER TO DELAY ROUTINE
001322  000000                  PARBIT: OPEN
001324  000000                  COUNT:  OPEN
001326  000000                  SAVE:   OPEN
001330  000000                  LINE:   OPEN
001332  000000                  CONFIG: OPEN
001334  000000                  NUMBER: OPEN
```

```
001336  000000                  OLDPS:  0
001340  000000                  TOPC:   0
001342  000000                  FROMPC: 0
001344  000000                  FTITLE: 0
001346  000000                  FNONE:  0
001350  000000                  FMAP:   0
001352  000000                  TEMP1:  0
001354  000000                  LINENO: 0
001356  000000                  RECDAT: OPEN
001360  000000                  XMTDAT: OPEN
001362  000000                  CARMSK: OPEN
001364  000000                  CTRD:   OPEN
001366  000000                  TXCSRT: OPEN
001370  000000                  RXCSRT: OPEN
001372  000000                  TEMP:   OPEN
001374  000000                  SRT:    OPEN
001376  000000                  INBUFP: OPEN
001400  000000                  BUFFP:  OPEN
001402  000000                  CALLER: OPEN
001404  000000                  CALLED: OPEN
001406  000000                  OTBUFP: OPEN        ;CONTAINS ADDRESS FROM WHERE NEXT TRAN-
                                                    ;SMITTED CHAR. (IN OUTBUF) IS TO COME

001410  000000                  TBUFFP: OPEN
001412  000000                  MODEM:  OPEN        ;CONTAINS MODEM TYPE 0=103,4=202
001414  000000                          OPEN    ;CONTAINS ADDRESS FROM WHERE NEXT TRANS-
                                                    ;MITTED CHAR. (CALLER'S LINE) IS TO COME
```

```
                                        ;
001416  005067  177722          REMAP:  CLR     FTITLE
001422  012706  001200          START:  MOV     #STKPTR,%6      ;SET BOTTOM OF SP STACK.
001426  000005                          RESET
001430  005067  176342                  CLR     PSW
001434  012767  004352  176342          MOV     #ERTP,MACHER
001442  012767  000040  176336          MOV     #40,MACHER+2
001450  005767  177670                  TST     FTITLE          ;TITLE PRINTED
001454  001145                          BNE     START1          ;YES, SKIP THIS
001456  104000                          TYPE
001460  011646                          MTITLE
001462  005267  177656                  INC     FTITLE          ;SET TITLE PRINTED FLAG
001466  005067  177654                  CLR     FNONE           ;CLEAR NO DEVICE FLAG
001472  012767  177777  177654          MOV     #-1,LINENO
001500  012767  001550  176276          MOV     #MAPNE,MACHER   ;SET UP FOR NO DEVICE ANSWER
001506  012767  000340  176272          MOV     #PRTY7,MACHER+2
001514  012704  010266                  MOV     #RCSR,%4        ;SET UP DEVICE POINTER
001520  005267  177630          MAPA:   INC     LINENO
001524  020427  010364                  CMP     %4,#RBUF        ;LAST DEVICE
001530  001477                          BEQ     MAPEND          ;YES
001532  005067  176240                  CLR     PSW
001536  005774  000000                  TST     @(4)            ;TEST DEVICE
001542  000240                          NOP
001544  000240                          NOP
001546  000404                          BR      MAPOK
001550  062704  000002          MAPNE:  ADD     #2,%4
001554  022626                          POPSP2
001556  000760                          BR      MAPA
001560  011467  177566          MAPOK:  MOV     (4),TEMP1       ;SAVE DEVICE FOR TYPING
001564  004567  001572                  JSR     %5,OACNV
001570  001352                          TEMP1
001572  012010                          MDADR
001574  000006                          6
001576  004567  001560                  JSR     %5,OACNV
001602  001354                          LINENO
001604  012002                          MLINE
001606  000002                          2
001610  011401                          MOV     (4),%1          ;GET RXCSR DEVICE ADDRESS
001612  004767  002720                  JSR     %7,FORMAD
001616  052767  000001  177524          BIS     #BIT0,FMAP
001624  042777  000100  177352          BIC     #BIT6,@TXCSR
001632  052777  000100  177344          BIS     #BIT6,@TXCSR
001640  000001                          WAIT
001642  012767  000340  176126          MOV     #PRTY7,PSW
001650  005767  177334                  TST     RXVTR
001654  001406                          BEQ     MAPOKA
001656  016701  177472                  MOV     LINENO,%1
001662  006301                          ASL     %1
001664  016761  177320  010170          MOV     RXVTR,VECTAB(1) ;STORE VECTOR
```

```
001672  042777  000100  177304  MAPOKA: BIC     #BIT6,@TXCSR
001700  004567  001456                  JSR     %5,DACNV
001704  001210                          RXVTR
001706  012022                          MTRAP
001710  000004                          4
001712  104000                          TYPE
001714  012002                          MLINE
001716  005267  177424                  INC     FNONE
001722  062704  000002                  ADD     #2,%4
001726  000674                          BR      MAPA
001730  012767  004352  176046  MAPEND: MOV     #ERTP,MACHER
001736  012767  000040  176042          MOV     #40,MACHER+2
001744  005767  177376                  TST     FNONE
001750  001007                          BNE     START1
001752  104000                  MAPERR: TYPE
001754  012032                          MNONE
001756  005067  177362                  CLR     FTITLE
001762  000000                          HALT
001764  000167  177432                  JMP     START
001770  005067  176002          START1: CLR     PSW
001774  104000                          TYPE
001776  012047                          MSWSEL
002000  000000                          HALT
002002  016700  175562                  MOV     SR,%0           ;(SR) TO R0
002006  042700  177770                  BIC     #177770,%0      ;LIMIT (SR) TO BITS 2-0
002012  010067  177222                  MOV     %0,PRGNUM       ;SAVE PROGRAM #
002016  006300                          ASL     %0              ;R0X2
002020  000170  001244                  JMP     @PRGTAB(0)      ;GO TO SELECTED PROGRAM.
```

```
                                        ;
002024  012706  001200          MODEV1: MOV     #STKPTR,%6
002030  000005                          RESET
002032  005067  175740                  CLR     PSW
002036  104000                  MODEV11: TYPE
002040  014172                          MMOD1
002042  000000                          HALT
002044  016700  175520                  MOV     SR,%0
002050  042700  177740                  BIC     #177740,%0
002054  006300                          ASL     %0
002056  026727  175506  000036          CMP     SR,#36
002064  101403                          BLOS    MODEV2          ;BRANCH IF > 36
002066  104000                          TYPE
002070  014120                          MMODX
002072  000761                          BR      MODEV1
002074  104000                  MODEV2: TYPE
002076  014314                          MMOD2
002100  000000                          HALT
002102  032767  000001  175460          BIT     #BIT0,SR
002110  001403                          BEQ     MODEV3
002112  104000                          TYPE
002114  014142                          MMODD
002116  000766                          BR      MODEV2
002120  016701  175444          MODEV3: MOV     SR,%1           ;SAVE DEV ADR
002124  010003                          MOV     %0,%3
002126  062703  010266                  ADD     #RCSR,%3
002132  010113                          MOV     %1,(3)
002134  062701  000002                  ADD     #2,%1           ;UPDATE DEV ADR
002140  010003                          MOV     %0,%3
002142  062703  010364                  ADD     #RBUF,%3
002146  010113                          MOV     %1,(3)
002150  062701  000002                  ADD     #2,%1           ;UPDATE DEV ADR
002154  010003                          MOV     %0,%3
002156  062703  010462                  ADD     #TCSR,%3
002162  010113                          MOV     %1,(3)
002164  062701  000002                  ADD     #2,%1           ;UPDATE DEV ADR
002170  010003                          MOV     %0,%3
002172  062703  010560                  ADD     #TBUF,%3
002176  010113                          MOV     %1,(3)
002200  104000                          TYPE
002202  014413                          MMOD3
002204  000000                          HALT
002206  026727  175356  177777          CMP     SR,#177777
002214  001710                          BEQ     MODEV1
002216  005067  177122                  CLR     FTITLE
002222  000167  177174                  JMP     START
```

```
                                        ;
                                        ;EMT TRAP INTERPRETER
002226  011646                  EMTINT: MOV     @%6,-(6)        ;GET SAVED PC.
002230  162716  000002                  SUB     #2,@%6          ;DECREMENT PC BY 2.
002234  017616  000000                  MOV     @(6),@%6
002240  006116                  EMTA:   ROL     @%6             ;EMT ARG X 2.
002242  042716  177001                  BIC     #177001,@%6     ;REMOVE 7 MSB.
002246  062716  001264                  ADD     #EMTTAB,@%6     ;FORM EMT RTN ADDR.
002252  017616  000000                  MOV     @(6),@%6
002256  000136                          JMP     @(6)+           ;GO TO EMT ROUTINE.
                                        ;
                                        ;SAVE REGS 0 TO 4 SUBROUTINE.
002260  012667  000030          SAVRG:  MOV     (6)+,SVRPC      ;SAVE PC AND PSW.
002264  012667  000026                  MOV     (6)+,SVRPSW
002270  010446                          MOV     %4,-(6)         ;SAVE REGS 0 - 4
002272  010346                          MOV     %3,-(6)         ;IN STACK.
002274  010246                          MOV     %2,-(6)
002276  010146                          MOV     %1,-(6)
002300  010046                          MOV     %0,-(6)
002302  016746  000010                  MOV     SVRPSW,-(6)     ;RESTORE PC AND PSW.
002306  016746  000002                  MOV     SVRPC,-(6)
002312  000002                          RTI                     ;EXIT.
002314  000000                  SVRPC:  OPEN
002316  000000                  SVRPSW: OPEN
                                        ;
                                        ;RESTORE REGS 0 TO 4 SUBROUTINE.
002320  012667  000030          RSTRG:  MOV     (6)+,RSTPC      ;SAVE PC AND PSW.
002324  012667  000026                  MOV     (6)+,RSTPSW
002330  012600                          MOV     (6)+,%0         ;RESTORE REGS 0 - 4
002332  012601                          MOV     (6)+,%1         ;FROM STACK.
002334  012602                          MOV     (6)+,%2
002336  012603                          MOV     (6)+,%3
002340  012604                          MOV     (6)+,%4
002342  016746  000010                  MOV     RSTPSW,-(6)     ;RESTORE PC AND PSW.
002346  016746  000002                  MOV     RSTPC,-(6)
002352  000002                          RTI                     ;EXIT
002354  000000                  RSTPC:  OPEN
002356  000000                  RSTPSW: OPEN
```

```
002360  104000                    INCPRG: TYPE                    ;TYPE INCORRECT PROGRAM SELECTED.
002362  013201                            AINPRG
002364  000000                            HALT
002366  000167  177030                    JMP     START
                                ;COMMON HALT ROUTINE
002372  011600                    CHLT:   MOV     @%6,%0          ;DEVELOP ADDRESS OF CALLER.
002374  162700  000002                    SUB     #2,%0
002400  000000                            HALT                    ;HALT, ADDRESS OF CALL INSTRUCTION
002402  000002                            RTI                     ;IN DATA LIGHTS.
                                ;
                                ;CONDITIONAL ERROR HALT ROUTINE.
002404  005767  175160            EHLT:   TST     SR              ;CHECK FOR HALT ON ERROR.
002410  100001                            BPL     EHLTA           ;BRANCH IF NO HALT DESIRED.
002412  000000                            HALT                    ;HALT.
002414  000002                    EHLTA:  RTI                     ;IN DATA LIGHTS.
                                ;
                                ;DATA CHECK ROUTINE.
002416  046767  176740  176734    DTCHK:  BIC     CARMSK,XMTDAT   ;CLEAR UNTRANSMITTED BITS
002424  126767  176726  176726            CMPB    RECDAT,XMTDAT   ;COMPARE TRANSMITTED AND RECEIVED
002432  001430                            BEQ     DTCHKA          ;CHARS. BRANCH IF SAME.
                                          CNVOA   RECDAT,CWAS,3
002434  004567  000722                    JSR     %5,OACNV        ;GO TO OCTAL TO ASCII CONVERT.
002440  001356                            RECDAT                  ;SOURCE ADDR.
002442  013154                            CWAS                    ;DESTINATION ADDR.
002444  000003                            3                       ;#OF DIGITS TO CONVERT.
                                          CNVOA   XMTDAT,CSB,3
002446  004567  000710                    JSR     %5,OACNV        ;GO TO OCTAL TO ASCII CONVERT.
002452  001360                            XMTDAT                  ;SOURCE ADDR.
002454  013142                            CSB                     ;DESTINATION ADDR.
002456  000003                            3                       ;#OF DIGITS TO CONVERT.
                                          CNVOA   RXCSR,CSRADD,6
002460  004567  000676                    JSR     %5,OACNV        ;GO TO OCTAL TO ASCII CONVERT.
002464  001200                            RXCSR                   ;SOURCE ADDR.
002466  012247                            CSRADD                  ;DESTINATION ADDR.
002470  000006                            6                       ;#OF DIGITS TO CONVERT.
002472  104013                            ERROR1
002474  012247                            CSRADD
002476  004567  001346                    JSR     5,BDCNV         ;CONVERT
002502  001364                            CTRD                    ;CHAR #
002504  013172                            CRNUM                   ;TO DECIMAL
002506  000004                            4                       ;4 BITS
002510  104013                            ERROR1
002512  013127                            CERDAT
002514  000002                    DTCHKA: RTI                     ; EXIT.
```

```
                                        ;
002516  012767  177777  000104  ERR:    MOV     #-1,ERRB        ;SET UP ONE MESSAGE CALL.
002524  012767  000240  000100          MOV     #240,ERRB+2
002532  005067  000112                  CLR     ERRE
002536  000413                          BR      ERRA
002540  011667  000064          ERR1:   MOV     @X6,ERRB        ;DEVELOP ADDT'L MESSAGE ADDR.
002544  017767  000060  000056          MOV     @ERRB,ERRB      ;STORE AT ERRB.
002552  012767  177777  000052          MOV     #-1,ERRB+2
002560  012767  000002  000062          MOV     #2,ERRE
002566  032767  020000  174774  ERRA:   BIT     #BIT13,SR       ;INHIBIT ERROR PRINT?
002574  001020                          BNE     ERRC            ;BRANCH TO INHIBIT PRINT.
002576  011667  000044                  MOV     @X6,ERRD        ;DEVELOP CALLING ADDR.
002602  162767  000002  000036          SUB     #2,ERRD
                                        CNVOA   ERRD,APC,6      ;CONVERT CALL ADDR TO ASCII.
002610  004567  000546                  JSR     X5,OACNV        ;GO TO OCTAL TO ASCII CONVERT.
002614  002646                          ERRD                    ;SOURCE ADDR.
002616  012324                          APC                     ;DESTINATION ADDR.
002620  000006                          6                       ;#OF DIGITS TO CONVERT.
002622  104011                          SAVREG
002624  104001                          TYPES                   ;TYPE:
002626  012317                          EM0                     ;ERROR HEADER,
002630  000000          ERRB:   OPEN                            ;ADDT'L ERROR MESSAGE IF ANY.
002632  177777                  -1
002634  104012                  RSTREG
002636  104010          ERRC:   EHALT                           ;GO ERR HALT IF DESIRED.
002640  066716  000004                  ADD     ERRE,@X6
002644  000002                          RTI                     ;EXIT.
002646  000000          ERRD:   OPEN
002650  000000          ERRE:   OPEN
                                        ;
                                        ;POWER FAIL SERVICE
002652  012737  002662  000024  PFAIL:  MOV     #PWRUP,@#24
002660  000000                          HALT
002662  012737  002652  000024  PWRUP:  MOV     #PFAIL,@#24
002670  000005                          RESET
002672  012706  001200                  MOV     #STKPTR,X6
002676  104000                          TYPE
002700  014062                          MPWRF
002702  016700  176332          RESTRT: MOV     PRGNUM,X0
002706  006300                          ASL     X0
002710  000170  001244                  JMP     @PRGTAB(0)
```

```
                                        ;
                                TXERR:  CNVOA   TXCSRT,ATXWAS,6 ;CONVERT CONTENTS OF TXCSR TO ASCII.
002714  004567  000442                  JSR     %5,OACNV        ;GO TO OCTAL TO ASCII CONVERT.
002720  001366                          TXCSRT                  ;SOURCE ADDR.
002722  012347                          ATXWAS                  ;DESTINATION ADDR.
002724  000006                          6                       ;#OF DIGITS TO CONVERT.
002726  012767  012335  000076          MOV     #ATXCSR,CRXTXB
002734  000410                          BR      CRXTX
                                RXERR:  CNVOA   RXCSRT,ARXWAS,6 ;CONVERT CONTENTS OF RXCSR TO ASCII.
002736  004567  000420                  JSR     %5,OACNV        ;GO TO OCTAL TO ASCII CONVERT.
002742  001370                          RXCSRT                  ;SOURCE ADDR.
002744  012370                          ARXWAS                  ;DESTINATION ADDR.
002746  000006                          6                       ;#OF DIGITS TO CONVERT.
002750  012767  012356  000054          MOV     #ARXCSR,CRXTXB
002756  011667  000046          CRXTX:  MOV     @X6,CRXTXA      ;DEVELOP ADDR OF ADDTT'L ERROR MESSAGE.
002762  017767  000042  000040          MOV     @CRXTXA,CRXTXA
002770  032767  020000  174572          BIT     #BIT13,SR       ;INHIBIT PRINT?
002776  001017                          BNE     CRXTXC          ;BRANCH TO INHIBIT PRINT.
003000  011667  177642                  MOV     @X6,ERRD        ;DEVELOP CALLING ADDR.
003004  162767  000002  177634          SUB     #2,ERRD
                                        CNVOA   ERRD,APC,6      ;CONVERT CALLING ADDR TO ASCII.
003012  004567  000344                  JSR     %5,OACNV        ;GO TO OCTAL TO ASCII CONVERT.
003016  002646                          ERRD                    ;SOURCE ADDR.
003020  012324                          APC                     ;DESTINATION ADDR.
003022  000006                          6                       ;#OF DIGITS TO CONVERT.
003024  104001                          TYPES                   ;TYPE ERROR MESSAGE.
003026  012317                          EMO                     ;ERR HEADER
003030  000000          CRXTXA: OPEN                            ;ADDT'L ERR MESSAGE
003032  000000          CRXTXB: OPEN                            ;TXCSR OR RXCSR CONTENTS.
003034  177777                  -1
003036  104010          CRXTXC: EHALT                           ;GO HALT IF DESIRED.
003040  062716  000002          ADD     #2,@X6
003044  000002                  RTI                             ;EXIT.
```

```
                                        ;
                                        ;ROUTINE TO SET RECEIVER INTERRUPT VECTOR AND PRIORITY
003046  017667  000000  000012  STRVRV: MOV     @(6),STPRA+2    ;MOVE VECTOR ADDR TO STPRA+2
003054  062716  000002                  ADD     #2,@X6          ;SET UP EXIT
003060  016701  176124                  MOV     RXVTR,X1
003064  012721  000000          STPRA:  MOV     #OPEN,(1)+      ;SET VECTOR ADDRESS
003070  016721  176116                  MOV     RXLVL,(1)+      ;SET PRIORITY
003074  000002                          RTI                     ;EXIT
                                        ;
                                        ;ROUTINE TO SET TRANSMITTER INTERRUPT VECTOR AND PRIORITY.
003076  017667  000000  000012  STXMTV: MOV     @(6),STPPA+2    ;MOVE VECTOR ADDR TO STPPA+2
003104  062716  000002                  ADD     #2,@X6          ;SET UP EXIT
003110  016701  176100                  MOV     TXVTR,X1
003114  012721  000000          STPPA:  MOV     #OPEN,(1)+      ;SET VECTOR ADDRESS.
003120  016721  176072                  MOV     TXLVL,(1)+      ;SET PRIORITY
003124  000002                          RTI                     ;EXIT.
                                        ;
                                        ;SUBROUTINE TO OUTPUT ASCII MESSAGE ON TELETYPE PRINTER.
003126  010067  000164          TYP:    MOV     X0 ,SAVR0               ;SAVE R0
003132  011600                          MOV     @X6,X0          ;GET ADDRESS THAT CONTAINS MESSAGE ADDRESS.
003134  062716  000002                  ADD     #2,@X6          ;SET UP EXIT.
003140  011000                          MOV     @X0,X0          ;ADDRESS OF MESSAGE TO R0.
003142  112067  000100          TYPA:   MOVB    (0)+,TYPDAT     ;GET CHARACTER
003146  122767  000100  000072          CMPB    #100,TYPDAT     ;CHECK FOR"@"CHARACTER
003154  001003                          BNE     TYPC            ;BRANCH IF NOT"@".
003156  016700  000134                  MOV     SAVR0,X0                ;RESTORE R0
003162  000002                          RTI                     ;TERMINATOR CHAR. DONE. EXIT.
003164  122767  000045  000054  TYPC:   CMPB    #45,TYPDAT      ;CHECK FOR"X".
003172  001412                          BEQ     TYPF            ;BRANCH IF"X"
003174  004767  000002                  JSR     X7,TYPD         ;TYPE CHAR IN TYPDAT
003200  000760                          BR      TYPA
003202  116777  000040  176016  TYPD:   MOVB    TYPDAT,@TPB     ;OUTPUT CHARACTER TO PRINTER
003210  105777  176010                  TSTB    @TPS            ;WAIT FOR DONE FLAG.
003214  100375                          BPL     .-4
003216  000207                          RTS     X7              ;EXIT
003220  112767  000015  000020  TYPF:   MOVB    #15,TYPDAT      ;MOVE CARRIAGE RETURN CODE TO TYPDAT
003226  004767  177750                  JSR     X7,TYPD         ;GO TYPE CHAR.
003232  112767  000012  000006          MOVB    #12,TYPDAT      ;MOVE LF CODE TO TYPDAT.
003240  004767  177736                  JSR     X7,TYPD         ;GO TYPE CHAR.
003244  000736                          BR      TYPA
003246  000000          TYPDAT: OPEN
```

```
                                        ;SUBROUTINE TO OUTPUT A SERIES OF ASCII MESSAGES ON TELETYPE PRINTER
003250  010067  000042          TYPS:   MOV     %0,SAVR0
003254  011600                  TYPSAA: MOV     @%6,%0          ;GET ADDRESS THAT CONTAINS MESSAGE ADDRESS
003256  062716  000002                  ADD     #2,@%6          ;UPDATE TO NEXT MESSAGE ADDRESS
003262  011067  000024                  MOV     @%0,TYPSB       ;ADDRESS OF MESSAGE TO TYPSB
003266  022767  177777  000016          CMP     #-1,TYPSB       ;CHECK FOR TERMINATOR
003274  001003                          BNE     TYPSA           ;BRANCH IF NOT TERMINATOR.
003276  016700  000014                  MOV     SAVR0,%0                ;RESTORE R0
003302  000002                          RTI                     ;TERMINATOR, EXIT
003304  016700  000006          TYPSA:  MOV     SAVR0,%0
003310  104000                          TYPE                    ;CALL ON TYP SUB TO TYPE MESSAGE
003312  000000                  TYPSB:  OPEN                    ;ADDRESS OF MESSAGE GOES HERE
003314  000757                          BR      TYPSAA          ;GO PROCESS NEXT MESSAGE
003316  000000                  SAVR0:  OPEN
                                        ;
                                        ;SUBROUTINE TO DELAY A SPECIFIED NUMBER OF MILLISECONDS
003320  011667  000034          DLY:    MOV     @%6,DLCNT       ;GET DELAY COUNT ADDRESS.
003324  062716  000002                  ADD     #2,@%6          ;SET UP EXIT ADDRESS
003330  017746  000024                  MOV     @DLCNT,-(6)     ;DELAY COUNT TO STACK
003334  001407                          BEQ     DLYC
003336  012746  000226          DLYA:   MOV     #226,-(6)       ;1 MSEC COUNT TO STACK
003342  005316                  DLYB:   DEC     @%6             ;DECREMENT 1 MSEC COUNT
003344  001376                          BNE     DLYB            ;BRANCH IF NOT 0.
003346  005726                          POPSP                   ;ZERO, UNCOVER MSECS, COUNT.
003350  005316                          DEC     @%6             ;DECREMENT IT
003352  001371                          BNE     DLYA            ;BR IF NOT DONE DELAYING
003354  005726                  DLYC:   POPSP                   ;DONE
003356  000002                          RTI                     ;EXIT.
003360  000000                  DLCNT:  OPEN                    ;CONTAINS MILLISECONDS COUNT ADDRESS.
                                        ;
                                        ;OCTAL TO ASCII CONVERT ROUTINE
003362  104011                  OACNV:  SAVREG                  ;SAVE REGS.
003364  013500                          MOV     @(5)+,%0        ;GET OCTAL VALUE.
003366  012501                          MOV     (5)+,%1         ;GET DESTINATION ADDR.
003370  012502                          MOV     (5)+,%2         ;GET CONVERT COUNT.
003372  060201                          ADD     %2,%1           ;DEVELOP ADDR TO STORE 1ST CHAR.
003374  010003                  OACNVA: MOV     %0,%3
003376  042703  177770                  BIC     #177770,%3      ;ISOLATE LEAST SIGNIFICANT DIGIT.
003402  062703  000060                  ADD     #60,%3          ;CONVERT DIGIT TO ASCII.
003406  110341                          MOVB    %3,-(1)         ;STORE ASCII CHARACTER.
003410  042700  000007                  BIC     #7,%0
003414  006000                          ROR     %0
003416  006000                          ROR     %0
003420  006000                          ROR     %0
003422  005302                          DEC     %2              ;DONE ALL DIGITS?
003424  001363                          BNE     OACNVA          ;BRANCH IF NOT DONE.
003426  104012                          RSTREG                  ;RESTORE REGS.
003430  000205                          RTS     %5              ;DONE, EXIT.
```

```
                        ;SUBROUTINE TO GENERATE PARITY ON DATA FOR 5,6,7,8 LEVEL CODE.
                        ;PARITY BIT IS THE MSB OF THE CHARACTER PARITY CAN BE EITHER
                        ;EVEN OR ODD
                        ;GENERATES ODD/EVEN PARITY.
                        ;
003432  032767  000200  175722  GENPAR: BIT     #BIT7,CARMSK    ;TEST LSB CHAR LENGTH
003440  001411                          BEQ     EIGHT           ;CHAR IS 8
003442  032767  000100  175712          BIT     #BIT6,CARMSK    ;TEST MSB CHAR LENGTH
003450  001427                          BEQ     SEVEN           ;CHAR LENGTH IS 7
003452  032767  000040  175702          BIT     #BIT5,CARMSK
003460  001412                          BEQ     SIX
003462  000433                          BR      FIVE
003464  012767  000200  175630  EIGHT:  MOV     #BIT7,PARBIT    ;PLACE PARITY BIT IN PROPER POSITION
003472  012767  000007  175624          MOV     #7,COUNT        ;SET UP ROTATE COUNTER=7
003500  042701  177600                  BIC     #177600,X1      ;MASK OFF UNUSED BITS
003504  000433                          BR      DOIT            ;GO AND GENERATE PARITY FOR 8
003506  012767  000040  175606  SIX:    MOV     #BIT5,PARBIT    ;PLACE PARITY BIT IN PROPER POSITION
003514  012767  000005  175602          MOV     #5,COUNT        ;SET UP ROTATE COUNTER=5
003522  042701  177740                  BIC     #177740,X1      ;MASK OFF UNUSED BITS
003526  000422                          BR      DOIT            ;GO AND GENERATE PARITY FOR
003530  012767  000100  175564  SEVEN:  MOV     #BIT6,PARBIT    ;PLACE PARITY BIT IN PROPER POSITION
003536  012767  000006  175560          MOV     #6,COUNT        ;SET UP ROTATE COUNTER=6
003544  042701  177700                  BIC     #177700,X1      ;MASK OFF UNUSED BITS
003550  000411                          BR      DOIT            ;GO AND GENERATE PARITY FOR 7
003552  012767  000020  175542  FIVE:   MOV     #BIT4,PARBIT    ;PLACE PARITY BIT IN PROPER POSITION
003560  012767  000004  175536          MOV     #4,COUNT        ;SET UP ROTATE COUNTER=4
003566  042701  177760                  BIC     #177760,X1      ;MASK OFF UNUSED BITS
003572  000400                          BR      DOIT            ;GO AND GENERATE PARITY FOR
003574  010167  175526          DOIT:   MOV     X1,SAVE         ;SAVE DATA
003600  006001                  AGAIN:  ROR     X1              ;ROTATE DATA
003602  103415                          BCS     ADD1            ;IF CARRY SET ADD IN PARBIT
003604  005367  175514          RTN:    DEC     COUNT           ;DECREMENT COUNTER
003610  001373                          BNE     AGAIN           ;NOT DONE DO IT AGAIN
003612  032767  000040  175554          BIT     #BIT5,SRT       ;DONE EVEN OR ODD PARITY?
003620  001403                          BEQ     DONE            ;IF EVEN FINISHED
003622  066767  175474  175476          ADD     PARBIT,SAVE     ;IF ODD ADD IN ANOTHER 1
003630  016701  175472          DONE:   MOV     SAVE,X1         ;PLACE DATA + PARITY BACK IN R1
003634  000207                          RTS     7               ;AND EXIT
003636  066767  175460  175462  ADD1:   ADD     PARBIT,SAVE     ;ADD PARBIT TO DATA
003644  000757                          BR      RTN             ;RETURN TO COUNTER
```

```
                                        ;SUBROUTINE TO SELECT LINE AND LOAD VECTOR ASSIGNMENT
003646  104000                  LINSEL: TYPE
003650  014032                          LDLINE
003652  000000                          HALT
003654  016701  173710                  MOV     SR,%1           ;LOAD R1
003660  042701  177407                  BIC     #177407,%1      ;MASK OFF ALL BUT LINE BITS
003664  006201                          ASR     %1
003666  006201                          ASR     %1
003670  010167  175476                  MOV     %1,TEMP         ;SAVE LINE #
003674  012703  001200                  MOV     #RXCSR,%3       ;LOAD ADDRESS OF REGISTERS
003700  012704  000004                  MOV     #4,%4           ;SET UP COUNTER
003704  016102  010266                  MOV     RCSR(1),%2
003710  010223                  LINSA:  MOV     %2,(3)+
003712  062702  000002                  ADD     #2,%2
003716  005304                          DEC     %4
003720  001373                          BNE     LINSA
003722  016101  010170                  MOV     VECTAB(1),%1    ;GET LINE VECTOR ADDRESS
003726  010123                          MOV     %1,(3)+         ;LOAD INTO PROG. RXVTR
003730  022121                          CMP     (1)+,(1)+       ;ADD +4 TO RXVTR TO # TXVTR
003732  005723                          TST     (3)+            ;POINT TO PROG TXVTR
003734  010113                          MOV     %1,(3)          ;LOAD INTO PROG TXVTR
003736  022767  000005  175274          CMP     #5,PRGNUM       ;RUNNING PROGRAM # 5
003744  001001                          BNE     .+4
003746  000205                          RTS     5               ;RETURN TO PROG 5
003750  006267  175416                  ASR     TEMP            ;POSITION
                                        CNVOA   TEMP,TLINEX,2
003754  004567  177402                  JSR     %5,OACNV        ;GO TO OCTAL TO ASCII CONVERT.
003760  001372                          TEMP                    ;SOURCE ADDR.
003762  013523                          TLINEX                  ;DESTINATION ADDR.
003764  000002                          2                       ;#OF DIGITS TO CONVERT.
003766  104000                          TYPE                    ;TYPE LINE # THAT
003770  013513                          ALINEX                  ;WAS CALLED
003772  000205                          RTS     5
                                        ;
                                        ;SUBROUTINE TO LOAD BINARY COUNT PATTERN INTO OUTPUT BUFFER
003774  105067  175334          INFIL:  CLRB    NUMBER          ;INITIALIZE BINARY COUNT
004000  012500                  FILL:   MOV     (5)+,%0         ;GET ADDRESS
004002  012567  175356                  MOV     (5)+,CTRD       ;GET COUNT
004006  116720  175322          FILLA:  MOVB    NUMBER,(0)+     ;LOAD ADDRESS WITH BINARY COUNT
004012  105267  175316                  INCB    NUMBER          ;INC. BINARY COUNT
004016  005367  175342                  DEC     CTRD            ;DEC. COUNT
004022  001371                          BNE     FILLA
004024  000205                          RTS     5               ;EXIT

                                        ;SUBROUTINE TO MOVE A VARIABLE NUMBER OF BYTES.
004026  104011                  BMOVE:  SAVREG                  ;SAVE REGS.
004030  012501                          MOV     (5)+,%1         ;GET"FROM"ADDRESS
004032  012502                          MOV     (5)+,%2         ;GET"TO"ADDRESS
004034  012503                          MOV     (5)+,%3         ;GET COUNT
004036  112122                  BMOVA:  MOVB    (1)+,(2)+       ;MOVE BYTE
004040  005303                          DEC     %3              ;DECREMENT COUNT
004042  001375                          BNE     BMOVA           ;BRANCH IF NOT DONE.
004044  104012                          RSTREG                  ;RESTORE REGS.
004046  000205                          RTS     %5              ;DONE EXIT
```

```
                                        ;
                                        ;BINARY TO DECIMAL ASCII CONVERT SUBROUTINE.
004050  104011                  BDCNV:  SAVREG                  ;SAVE REGS.
004052  012700  004226                  MOV     #DECVAL,%0      ;SET UP ADDR TO STORE DECIMAL ASCII IN R0
004056  013501                          MOV     @(5)+,%1        ;BINARY VALUE TO R1.
004060  012567  000052                  MOV     (5)+,BDCNVC     ;DESTINATION ADDR TO BDCNVC.
004064  012567  000050                  MOV     (5)+,BDCNVD     ;COUNT TO BDCNVD.
004070  012702  004214                  MOV     #ADTENP,%2      ;ADDR OF TEN POWER STRING TO R2.
004074  012767  000005  000104          MOV     #5,CNVCTR       ;SET UP FOR 5 POWER CONVERSIONS.
004102  012267  000104          BDCNVA: MOV     (2)+,TENPWR     ;MOVE POWER OF TEN VALUE TO TENPWR.
004106  004767  000034                  JSR     %7,SUBTEN       ;PERFORM CONVERSION
004112  005367  000070                  DEC     CNVCTR          ;DONE 5 CONVERSIONS?
004116  001371                          BNE     BDCNVA          ;BRANCH IF NOT YET 5.
004120  166700  000014                  SUB     BDCNVD,%0       ;SET UP ADDR TO MOVE DECIMAL
004124  010067  000004                  MOV     %0,BDCNVB       ;DATA FROM.
004130  004567  177672                  JSR     %5,BMOVE        ;MOVE DECIMAL DATA TO DESTINATION.
004134  000000                  BDCNVB: OPEN                    ;SRC ADDR.
004136  000000                  BDCNVC: OPEN                    ;DEST ADDR.
004140  000000                  BDCNVD: OPEN                    ;COUNT.
004142  104012                          RSTREG                  ;RESTORE REGS.
004144  000205                          RTS     %5              ;YES, EXIT.
004146  005067  000036          SUBTEN: CLR     DIGIT           ;CLEAR DIGIT
004152  166701  000034          SUBTNA: SUB     TENPWR,%1       ;SUBTRACT TEN POWER FROM BINARY VALUE.
004156  103403                          BCS     SUBTNB          ;BRANCH IF UNSUCCESSFUL SUBTRACTION.
004160  005267  000024                  INC     DIGIT
004164  000772                          BR      SUBTNA
004166  066701  000020          SUBTNB: ADD     TENPWR,%1       ;RESTORE SUBTRACTED VALUE.
004172  062767  000060  000010          ADD     #60,DIGIT       ;CONVERT (DIGIT) TO ASCII
004200  116720  000004                  MOVB    DIGIT,(0)+      ;MOVE ASCII CHAR TO DECVAL FIELD.
004204  000207                          RTS     %7              ;EXIT.
004206  000000                  CNVCTR: OPEN
004210  000000                  DIGIT:  OPEN
004212  000000                  TENPWR: OPEN
004214  023420                  ADTENP: 10000.
004216  001750                          1000.
004220  000144                          100.
004222  000012                          10.
004224  000001                          1
004226    040     040     040   DECVAL: .BYTE   040,040,040,040,040,040
004231    040     040     040
```

```
                                        ;SUBROUTINE TO SET  CHARACTER LENGTH PARAMETER
004234  104000                  SETPAR: TYPE                    ;TYPE: SELECT PARAMETERS.
004236  012745                          SELPAR
004240  000000                          HALT                    ;WAIT FOR USER.
004242  016767  173322  175124          MOV     SR,SRT
                                        CNVOA   SRT,APARM,3
004250  004567  177106                  JSR     %5,OACNV        ;GO TO OCTAL TO ASCII CONVERT.
004254  001374                          SRT                     ;SOURCE ADDR.
004256  013222                          APARM                   ;DESTINATION ADDR.
004260  000003                          3                       ;#OF DIGITS TO CONVERT.
004262  104000                          TYPE
004264  013204                          PARMTS
004266  012767  177400  175066  TBIT1:  MOV     #177400,CARMSK          ;SET CHARACTER MASK TO 8 BITS.
004274  032767  000002  175072          BIT     #BIT1,SRT               ;SEE IF SR BIT 1 IS SET.
004302  001413                          BEQ     STPARA                  ;BRANCH IF NOT SET.
004304  012767  177700  175050          MOV     #177700,CARMSK          ;CHANGE CHAR MASK TO 6 BITS.
004312  032767  000001  175054          BIT     #BIT0,SRT               ;SEE IF SR BIT0 IS SET.
004320  001403                          BEQ     PAREX                   ;BRANCH IF NOT SET.
004322  012767  177740  175032          MOV     #177740,CARMSK          ;CHANGE CHAR MASK TO 5 BITS.
004330  000207                  PAREX:  RTS     %7                      ;EXIT.
004332  032767  000001  175034  STPARA: BIT     #BIT0,SRT               ;SEE IF SR BIT0 IS SET.
004340  001773                          BEQ     STPARA-2                ;BRANCH IF NOT SET.
004342  012767  177600  175012          MOV     #177600,CARMSK          ;CHANGE CHAR MASK TO 7 BITS.
004350  000767                          BR      PAREX
                                        ;
                                        ;ERROR TRAP HANDLER - TYPE TO AND FROM WHERE ERROR TRAP OCCURS
004352  016767  173420  174756  ERTP:   MOV     PSW,OLDPS       ;SAVE OLDPS
004360  012767  000340  173410          MOV     #PRTY7,PSW
004366  006267  174744                  ASR     OLDPS
004372  006267  174740                  ASR     OLDPS
004376  006267  174734                  ASR     OLDPS
004402  042767  177740  174726          BIC     #177740,OLDPS
004410  016767  174722  174722          MOV     OLDPS,TOPC
004416  011667  174720                  MOV     @%6,FROMPC
004422  004567  176734          ERTPA:  JSR     %5,OACNV
004426  001340                          TOPC
004430  012204                          MTO
004432  000006                          6
004434  004567  176722                  JSR     %5,OACNV
004440  001342                          FROMPC
004442  012236                          MFROM
004444  000006                          6
004446  104000                          TYPE
004450  012137                          MTERR
004452  000000                          HALT
004454  000167  174742                  JMP     START
```

```
                                        ;
                                        ;MAPVEC - MAP VECTOR VECTOR OR REPORT ERROR DEPENDING ON FMAP FLAG
004460  011667  174654          MAPVEC: MOV     @X6,TOPC
004464  022626                  POPSP2
004466  011667  174650                  MOV     @X6,FROMPC
004472  162767  000004  174640          SUB     #4,TOPC
004500  005767  174644                  TST     FMAP
004504  001746                          BEQ     ERTPA           ;NOT MAPPING, REPORT ERROR
004506  016767  174626  174500          MOV     TOPC,TXVTR      ;STORE VECTOR
004514  162767  000004  174616          SUB     #4,TOPC
004522  016767  174612  174460          MOV     TOPC,RXVTR
004530  005067  174614                  CLR     FMAP
004534  000002                          RTI
                                        ;
                                        ;FORMAD - FORM DEVICE AT ADDRESS
004536  010167  174436          FORMAD: MOV     X1,RXCSR
004542  062701  000002                  ADD     #2,X1
004546  010167  174430                  MOV     X1,RXBUF
004552  062701  000002                  ADD     #2,X1
004556  010167  174422                  MOV     X1,TXCSR
004562  062701  000002                  ADD     #2,X1
004566  010167  174414                  MOV     X1,TXBUF
004572  000207                          RTS     X7
                                        ;
                                        ;SUBROUTINE TO MAKE LINE CONNECTION.
004574  017767  174400  174566  LINCON: MOV     @RXCSR,RXCSRT
004602  032767  020000  174560          BIT     #BIT13,RXCSRT   ;YES, IS CLEAR TO SEND UP
004610  001046                          BNE     LINEUP          ;YES CONNECTION IS MADE,
004612  042777  000146  174360  LINCA:  BIC     #146,@RXCSR     ;CLEAR IE BIT AND DTR, RQ TO SND
004620  005777  174356                  TST     @RXBUF          ;CLEAR DONE FLAG
004624  104000                          TYPE                    ;TYPE
004626  013100                          MAKCON                  ;'MAKE LINE CONNECTION'
004630  017767  174344  174532  LINCB:  MOV     @RXCSR,RXCSRT
004636  032767  040000  174524          BIT     #BIT14,RXCSRT   ;DID YOU RING
004644  001771                          BEQ     LINCB           ;GO WAIT FOR RING
004646  052777  000006  174324          BIS     #6,@RXCSR       ;SET DTR, RQ TO SND
004654  104016                          DELAY                   ;WAIT 10 SECONDS FOR
004656  023420                          10000.                  ;CLEAR TO SEND
004660  017767  174314  174502          MOV     @RXCSR,RXCSRT
004666  005777  174310                  TST     @RXBUF          ;CLEAR DONE
004672  032767  020000  174470          BIT     #BIT13,RXCSRT   ;IS CLEAR TO SEND UP?
004700  001003                          BNE     LINCF           ;YES.  GO TO LINCF
004702  104015                          ERRRX                   ;NO.  PRINT ERROR MESSAGE
004704  013226                          LINCHM                  ;'CLEAR TO SEND NOT SET'
004706  000741                          BR      LINCA           ;START OVER AGAIN
004710  017767  174264  174452  LINCF:  MOV     @RXCSR,RXCSRT   ;CLEAR ALL FLAGS
004716  005777  174260                  TST     @RXBUF          ;AND DONE
004722  104000                          TYPE                    ;TYPE MESSAGE
004724  013256                          LINMAD                  ;CONNECTION IS MADE'
004726  000205                  LINEUP: RTS     5               ;EXIT LINE CONNECTION ROUTINE WITH
```

```
                                        ;SUBROUTINE TO OVERLAY <CRLF> IN DATA PATTERN (EVERY 72,ND CHAR)
004730  012701  014524          OVRLAY: MOV     #OUTBUF,X1      ;GET OUTBUF ADDRESS
004734  012702  000016                  MOV     #14.,X2         ;GET COUNTER
004740  012711  105215          OVRLYA: MOV     #105215,(1)     ;INSERT CR&LF
004744  062701  000110                  ADD     #72.,X1         ;ADD OFFSET
004750  005302                          DEC     X2              ;DONE?
004752  001372                          BNE     OVRLYA
004754  000207                          RTS     7               ;EXIT
                                        ;
                                        ;RECEIVER INTERRUPTS COMMON HANDLER
004756  000240          RISR:   NOP
004760  010067  174344                  MOV     X0,LINE
004764  006300                          ASL     X0
004766  016067  010266  174204          MOV     RCSR(0),RXCSR   ;GET ADDRESS OF INTERRUPTING DL11-E'S RCSR
004774  017767  174200  174366          MOV     @RXCSR,RXCSRT   ;GET CSR CONTENTS
005002  100570                          BMI     DCERR           ;CHECK INT
005004  105767  174360                  TSTB    RXCSRT          ;TEST DONE
005010  001002                          BNE     RISRA
005012  104003                          ERROR                   ;FALSE INTERRUPT
005014  000002                          RTI                     ;EXIT
005016  020067  174362          RISRA:  CMP     X0,CALLED       ;DID CALLED LINE INTERRUPT?
005022  001020                          BNE     RISRB           ;BRANCH IF CALLER INTERRUPTED
005024  005767  174362                  TST     MODEM           ;CHECK MODEM TYPE
005030  001403                          BEQ     RISRAA          ;BRANCH IF 103
005032  005770  010364                  TST     @RBUF(0)        ;READ CALLED LINES DATA
005036  000002                          RTI
005040  117077  010364  174330  RISRAA: MOVB    @RBUF(0),@INBUFP;STORE CHARACTER IN INPUT BUFFER
005046  005267  174324                  INC     INBUFP          ;INCREMENT POINTER
005052  022767  016640  174316          CMP     #INBUF+100.,INBUFP;HAVE 100. CHARACTERS BEEN RECEIVED?
005060  001430                          BEQ     RISRC           ;GO CHECK DATA IF YES
005062  000002                          RTI                     ;EXIT IF NO
005064  117077  010364  174306  RISRB:  MOVB    @RBUF(0),@BUFFP ;STORE CHARACTER IN INTERMEDIATE DATA BUFFER
005072  005267  174302                  INC     BUFFP           ;INCREMENT POINTER
005076  022767  014702  174274          CMP     #BUFF+10.,BUFFP ;HAVE 10 CHARACTERS BEEN RECEIVED
005104  002401                          BLT     .+4
005106  000002                          RTI                     ;EXIT
005110  022767  000002  174214          CMP     #2,CONFIG       ;RUNNING CONFIGURATION 2?
005116  001405                          BEQ     RISRBB
005120  022767  015034  174252          CMP     #BUFF+100.,BUFFP;HAVE 100. CHARACTERS BEEN RECEIVED?
005126  001405                          BEQ     RISRC           ;GO CHECK DATA IF YES,OTHERWISE
005130  000002                          RTI                     ;EXIT
005132  052770  000100  010462  RISRBB: BIS     #BIT6,@TCSR(0)  ;START CALLERS TRANSMITTER
005140  000002                          RTI                     ;EXIT
```

```
                                        ;CHECK DATA CONFIGURATION #1
005142  000240                  RISRC:  NOP
005144  012767  000001  174212          MOV     #1,CTRD         ;INITIALIZE CHARACTER COUNT
005152  012702  014670                  MOV     #BUFF,X2        ;POINT R2 TO CALLERS RECEIVED DATA BUFFER
005156  012703  014524                  MOV     #OUTBUF,X3      ;R3 = FIRST ADDRESS OF OUTPUT DATA BUFFER
005162  010267  174212                  MOV     X2,BUFFP        ;RESTORE CALLERS RCVD DATA BUFFER PTR
005166  022767  000001  174136          CMP     #1,CONFIG       ;CHECK CONFIGURATION
005174  001015                          BNE     RISRD
005176  112367  174156          RISRCA: MOVB    (3)+,XMTDAT     ;GET TRANSMITTED CHARACTER
005202  112267  174150                  MOVB    (2)+,RECDAT     ;GET RECEIVED CHARACTER
005206  104004                          DATCHK                  ;CHECK DATA
005210  005267  174150                  INC     CTRD            ;INCREMENT CHARACTER COUNT
005214  022767  000101  174142          CMP     #101,CTRD       ;HAS ALL DATA BEEN CHECKED
005222  001365                          BNE     RISRCA
005224  000167  000100                  JMP     FINISH
                                        ;
                                        ;CHECK DATA CONFIGURATION #2
005230  000240                  RISRD:  NOP
005232  012704  016474                  MOV     #INBUF,X4       ;POINT R4 TO CALLED LINES RECEIVER
005236  010467  174134                  MOV     X4,INBUFP       ;DATA BUFFER & INIT. POINTER
005242  012767  014670  174140          MOV     #BUFF,TBUFFP
005250  016701  174130          RISRDA: MOV     CALLED,X1
005254  016167  010266  173716          MOV     RCSR(1),RXCSR
005262  112367  174072                  MOVB    (3)+,XMTDAT
005266  112267  174064                  MOVB    (2)+,RECDAT     ;COMPARE TRANSMITTED DATA WITH DATA
005272  104004                          DATCHK                  ;RECEIVED BY CALLED LINE
005274  016701  174102                  MOV     CALLER,X1
005300  016167  010266  173672          MOV     RCSR(1),RXCSR
005306  112467  174044                  MOVB    (4)+,RECDAT     ;COMPARE TRANSMITTED DATA WITH DATA
005312  104004                          DATCHK                  ;RECEIVED BY CALLER
005314  005267  174044                  INC     CTRD
005320  022767  000101  174036          CMP     #101,CTRD
005326  001350                          BNE     RISRDA
005330  000240                  FINISH: NOP
005332  016701  174046                  MOV     CALLED,X1
005336  004567  176436                  JSR     5,FILL
005342  014524                          OUTBUF
005344  000144                          100.
005346  104000                          TYPE
005350  013177                          ENDPAS
005352  052771  000100  010462          BIS     #BIT6,@TCSR(1)
005360  000240                          NOP
005362  000002                          RTI
```

```
                                        ;ERROR SERVICE ROUTINE
005364  032770  100000  010364  DCERR:  BIT     #BIT15,@RBUF(0) ;TEST ERROR
005372  001402                          BEQ     RISRF
005374  104015                          ERRRX
005376  012247                          CSRADD
005400  012767  014524  174000  RISRF:  MOV     #OUTBUF,OTBUFP  ;SET OUTPUT BUFFER POINTER
005406  012767  016474  173762          MOV     #INBUF,INBUFP   ;SET INPUT BUFFER POINTER
005414  012767  014670  173756          MOV     #BUFF,BUFFP     ;SET INTERMEDIATE BUFFER POINTER
005422  012767  014670  173760          MOV     #BUFF,TBUFFP    ;SET POINTER FOR CONFIG #2 TRANSMITTER
005430  032767  040000  173732          BIT     #BIT14,RXCSRT   ;CHECK RING INDICATOR
005436  001005                          BNE     RISREX          ;BRANCH IF RING
005440  004767  000424                  JSR     7,DISCON        ;ERROR SET = NO RING
005444  104015                          ERRRX
005446  012247                          CSRADD
005450  000002                          RTI
                                RISREX: CNVOA   LINE,TLINE,2
005452  004567  175704                  JSR     %5,OACNV        ;GO TO OCTAL TO ASCII CONVERT.
005456  001330                          LINE                    ;SOURCE ADDR.
005460  013553                          TLINE                   ;DESTINATION ADDR.
005462  000002                          2                       ;#OF DIGITS TO CONVERT.
005464  104000                          TYPE
005466  013543                          ALINE
005470  010067  173710                  MOV     %0,CALLED
005474  000000                          HALT
005476  116767  172066  173706          MOVB    SR,MODEM        ;GET MODEM TYPE
005504  042767  177773  173700          BIC     #177773,MODEM   ;0=103,4=202
005512  116767  172052  173612          MOVB    SR,CONFIG
005520  042767  177774  173604          BIC     #177774,CONFIG
005526  001042                          BNE     RISRFC          ;GO TO SERVICE FOR CONFIG 1 OR 2
005530  004767  000350                  JSR     7,CONN          ;CONNECT LINE IF CONFIGURATION 0
005534  104000                          TYPE                    ;TYPE MESSAGE TO PRESS DATA
005536  013771                          BUTTON                  ;BUTTON ON DATA PHONE
005540  104016                          DELAY                   ;WAIT FOR CARRIER
005542  023420                          10000.                  ;10 SECONDS
005544  005770  010364                  TST     @RBUF(0)        ;READ BUFFER TO CLEAR DONE
005550  032770  020000  010266          BIT     #BIT13,@RCSR(0) ;TEST FOR CLEAR TO SEND
005556  001004                          BNE     RISRFB
005560  104003                          ERROR                   ;ERROR: DID NOT RECEIVE CLEAR TO SEND
                                                                ;WITHIN TIME ALLOTTED (10 SEC.)
005562  004767  000302                  JSR     7,DISCON        ;DISCONNECT LINE
005566  000002                          RTI                     ;AND EXIT
```

```
005570  016067  010462  173406  RISRFB: MOV     TCSR(0),TXCSR   ;GET CALLED LINES TXCSR ADDRESS
005576  004767  176432                  JSR     7,SETPAR        ;LOAD USER PARAMETERS
005602  104000                          TYPE                    ;TYPE 'LINE CONNECTION
005604  013256                          LINMAD                  ;MADE'
                                        CNVOA   CONFIG,TCONFIG,2
005606  004567  175550                  JSR     %5,OACNV        ;GO TO OCTAL TO ASCII CONVERT.
005612  001332                          CONFIG                  ;SOURCE ADDR.
005614  013326                          TCONFIG                 ;DESTINATION ADDR.
005616  000002                          2                       ;#OF DIGITS TO CONVERT.
005620  104000                          TYPE
005622  013305                          ACONFIG
005624  052770  000100  010462          BIS     #BIT6,@TCSR(0)
005632  000002                          RTI                     ;AND EXIT
                                    ;
                                    ;HERE IF CONFIGURATION 1 OR 2
005634  104000                  RISRFC: TYPE                    ;ASK USER WHICH LINE HE IS
005636  013667                          WRU                     ;DIALING ON
005640  000000                          HALT
005642  016701  171722                  MOV     SR,%1           ;GET LINE #
005646  042701  177740                  BIC     #177740,%1      ;MASK UNUSED BITS
005652  010167  173452                  MOV     %1,LINE
                                        CNVOA   LINE,URA,2
005656  004567  175500                  JSR     %5,OACNV        ;GO TO OCTAL TO ASCII CONVERT.
005662  001330                          LINE                    ;SOURCE ADDR.
005664  013766                          URA                     ;DESTINATION ADDR.
005666  000002                          2                       ;#OF DIGITS TO CONVERT.
005670  104000                          TYPE                    ;REPORT LINE # ON TTY
005672  013736                          UR
005674  006301                          ASL     %1
005676  010167  173500                  MOV     %1,CALLER       ;SAVE CALLERS LINE #
005702  004767  000176                  JSR     7,CONN          ;CONNECT CALLED LINE
005706  052771  000002  010266          BIS     #BIT1,@RCSR(1)  ;SET DTR ON CALLERS LINE
005714  104000                          TYPE                    ;TYPE MESSAGE TO PRESS DATA
005716  013771                          BUTTON                  ;ON DATA PHONE
005720  104016                          DELAY                   ;WAIT 10 SECONDS FOR CLEAR TO SEND
005722  023420                          10000.                  ;SET AT CALLED LINE
005724  027071  010364  010364          CMP     @RBUF(0),@RBUF(1)       ;HEAD BUFFERS
005732  032770  020000  010266          BIT     #BIT13,@RCSR(0) ;TEST FOR CLEAR TO SEND AT CALLED LINE
005740  001007                          BNE     RISRFF
005742  104003                          ERROR                   ;ERROR! CLEAR TO SEND NOT SET AT CALLED LINE
005744  004767  000120          RISRFD: JSR     7,DISCON        ;DISCONNECT
005750  042771  000006  010266          BIC     #6,@RCSR(1)     ;LINE
005756  000002                          RTI                     ;AND EXIT
```

```
005760  022767  000002  173344  RISRFF: CMP     #2,CONFIG
005766  001414                  BEQ     RISRFG
005770  022771  010000  010266          CMP     #BIT12,@RCSR(1) ;CHECK CARRIER AT CALLERS LINE
005776  001003                  BNE     RISRFE
006000  104003                  ERROR                           ;ERROR: NO CARRIER AT CALLERS LINE
006002  000167  177736          JMP     RISRFD                  ;GO DISCONNECT LINES
006006  016167  010266  173164  RISRFE: MOV     RCSR(1),RXCSR
006014  000167  177550          JMP     RISRFB                  ;GO GET PAREMETERS AND ENABLE
                                                                ;CALLED TRANSMITTER AND EXIT
                                ;
                                ;HERE IF CONFIGURATION 2
006020  032771  020000  010266  RISRFG: BIT     #BIT13,@RCSR(1) ;TEST CALLERS CLEAR TO SEND
006026  001003                  BNE     RISRFH
006030  104003                  ERROR                           ;ERROR: NO CTS AT CALLERS LINE
006032  000167  177706          JMP     RISRFD                  ;GO DISCONNECT LINE AND EXIT
006036  016067  010266  173134  RISRFH: MOV     RCSR(0),RXCSR
006044  016167  010462  173132          MOV     TCSR(1),TXCSR
006052  004767  176156          JSR     7,SETPAR                ;GO GET PARAMETERS FOR CALLERS
                                                                ;TRANSMITTER AND CALLED RECEIVER
006056  016167  010266  173114          MOV     RCSR(1),RXCSR
006064  000167  177500          JMP     RISRFB
                                ;
                                ;SUBROUTINE TO DISCONNECT LINE R0 HAS LINE #
006070  042770  000006  010266  DISCON: BIC     #6,@RCSR(0)
006076  005770  010266                  TST     @RCSR(0)
006102  000207                  RTS     7
                                ;
                                ;SUBROUTINE TO CONNECT LINE R0 HAS LINE #
006104  052770  000006  010266  CONN:  BIS     #6,@RCSR(0)     ;SET DTR, RQ TO SND
006112  000207                  RTS     7
```

```
                                        ;TRANSMITTER INTERRUPT COMMON HANDLER
006114  000240                  TISR:   NOP
006116  006300                          ASL     %0              ;R0 HAS LINE #
006120  105770  010462                  TSTB    @TCSR(0)        ;CHECK FOR DONE
006124  100402                          BMI     TISRA           ;BRANCH IF DONE
006126  104003                          ERROR                   ;ERROR: FALSE INTERRUPT
006130  000002                  TISRAA: RTI                     ;EXIT
006132  005767  173174          TISRA:  TST     CONFIG          ;THIS CONFIGURATIO 0?
006136  001420                          BEQ     TISRC           ;BRANCH IF YES
006140  020067  173236                  CMP     %0,CALLER       ;DID CALLER INTERRUPT
006144  001015                          BNE     TISRC
006146  117770  173236  010560          MOVB    @TBUFFP,@TBUF(0)        ;TRANSMIT
006154  005267  173230                  INC     TBUFFP          ;STEP POINTER
006160  022767  015034  173222          CMP     #BUFF+100.,TBUFFP
006166  001003                          BNE     .+10
006170  042770  000100  010462          BIC     #BIT6,@TCSR(0)
006176  000002                          RTI
006200  117770  173202  010560  TISRC:  MOVB    @OTBUFP,@TBUF(0)        ;TRANSMIT THE NEXT CHARACTER
006206  005267  173174                  INC     OTBUFP          ;STEP POINTER TO NEXT CHAR.
006212  005767  173114                  TST     CONFIG          ;WAS CONFIGURATION 0 SELECTED
006216  001010                          BNE     TISRB           ;BRANCH IF CONFIG #1 OR #2
006220  022767  016474  173160          CMP     #OUTBUF+1000.,OTBUFP;HAVE 1000. CHARS. BEEN SENT
006226  001340                          BNE     TISRAA          ;EXIT IF NOT
006230  012767  014524  173150  TISRBB: MOV     #OUTBUF,OTBUFP  ;RESET POINTER
006236  000002                          RTI                     ;AND EXIT

006240  022767  014670  173140  TISRB:  CMP     #OUTBUF+100.,OTBUFP;HAVE 100. CHARS. BEEN SENT?
006246  001330                          BNE     TISRAA          ;EXIT IF NOT
006250  042770  000100  010462          BIC     #BIT6,@TCSR(0)  ;DISABLE TRANSMITTER INTERRUPT
006256  000764                          BR      TISRBB          ;RESET POINTER AND EXIT
```

```
                                        ;**********
                                        ;PRG0 - SINGLE CHARACTER LINE MODE TEST.
                                        ;**********
006260  000240                  PRG0:  NOP                     ;BEGIN PRG0
006262  104000                         TYPE                    ;TYPE
006264  012377                         POTIT                   ;PROGRAM TITLE
006266  104000                         TYPE
006270  013040                         SELCAR
006272  000000                         HALT
006274  116701  171270               MOVB    SR,%1           ;GET USER SPECIFIED  DATA
006300  010167  006220               MOV     %1,OUTBUF       ;AND
006304  004567  175516               JSR     5,BMOVE         ;LOAD
006310  014524                       OUTBUF                  ;INTO
006312  014525                       OUTBUF+1                ;OUTPUT
006314  001747                       999.                    ;BUFFER
006316  004767  176406               JSR     7,OVRLAY        ;OVER LAY CR,LF'S IN DATA
006322  004767  001602               JSR     7,LDPRI         ;LOAD PRIORITY LEVEL IN VECTOR+2
006326  004767  001530               JSR     7,LDTVEC        ;LOAD TRANSMITTER VECTORS
006332  004767  001460               JSR     7,LDVECS        ;LOAD RECEIVER VECTORS
006336  012767  000340  171432       MOV     #PRTY7,PSW      ;SET PROCESSOR PRIORITY=7
006344  012702  000140               MOV     #140,%2         ;SET IE
006350  012701  010266               MOV     #RCSR,%1                ;BIT IN
006354  004567  001372               JSR     5,MOVIT         ;ALL RECEIVERS
006360  104000                       TYPE                    ;TYPE
006362  013100                       MAKCON                  ;!MAKE LINE CONNECTION!
006364  005067  171406               CLR     PSW             ;SET PROCESSOR PRIORITY=0
006370  000001                 PRG0A: WAIT                    ;WAIT
006372  000776                       BR      PRG0A           ;HERE
```

```
                                        ;**********
                                        ;PRG1 - SPECIAL BINARY COUNT PATTERN LINE MODE TEST.
                                        ;**********
006374  104000                  PRG11:  TYPE                        ;TYPE PROGRAM TITLE.
006376  012443                          P1TIT
006400  012767  105215  006116          MOV     #105215,OUTBUF      ;LOAD CRLF
006406  004567  175362                  JSR     5,INFIL             ;LOAD OUTPUT
006412  014526                          OUTBUF+2                    ;WITH BINARY
006414  001750                          1000.                       ;COUNT PATTERN
006416  012767  000100  172710          MOV     #100,NUMBER
006424  004767  001500                  JSR     7,LDPRI             ;LOAD PRIORITY LEVEL IN VECTOR +2
006430  004767  001426                  JSR     7,LDTVEC            ;LOAD TRANSMITTER VECTORS
006434  004767  001356                  JSR     7,LDVEC6            ;LOAD RECEIVER VECTORS
006440  012767  000340  171330          MOV     #PRTY7,PSW          ;SET PROCESSOR PRIORITY=7
006446  012702  000140                  MOV     #140,%2             ;GET IE BIT
006452  012701  010266                  MOV     #RCSR,%1                    ;GET FIRST CSR ADDRESS
006456  004567  001270                  JSR     5,MOVIT             ;AND MOVE IT
006462  104000                          TYPE                        ;TYPE
006464  013100                          MAKCON                      ;'MAKE LINE CONNECTION'
006466  005067  171304                  CLR     PSW                 ;SET PROCESSOR PRIORITY=0
006472  000001                  PRG1C:  WAIT                        ;WAIT
006474  000776                          BR      PRG1C               ;HERE
```

```
                                        ;**********
                                        ;PRG2-SPECIAL MESSAGE TRANSMIT ONLY THIS PROGRAM TRANSMITS
                                        ;**********
                                        ;THE MESSAGE 'A QUICK BROWN FOX JUMPED OVER THE LAZY DOGS
                                        ;BACK  1234567890.'
                                        ;
006476  104000                          PRG2:   TYPE                    ;TYPE PROGRAM
006500  012512                                  P2TIT                   ;TITLE
006502  004567  175140                          JSR     5,LINSEL
006506  004767  175522                          JSR     7,SETPAR        ;GO SET PARAMETERS
006512  052777  000004  172460                  BIS     #BIT2,@RXCSR    ;SET REQUEST TO SEND
006520  004567  176050                  PRG2A:  JSR     5,LINCON        ;GO MAKE LINE CONNECTION
006524  012702  013332                  PRG2B:  MOV     #PRG2M,X2       ;GET ADDRESS OF MESSAGE
006530  112201                          PRG2C:  MOVB    (2)+,X1         ;GET FIRST CHARACTER
006532  020127  000045                          CMP     X1,#'%          ;TERMINATOR CHARACTER
006536  001772                                  BEQ     PRG2B           ;RESEND MESSAGE
006540  032767  000100  172626                  BIT     #BIT6,@RT       ;PARITY ENABLED
006546  001402                                  BEQ     .+6
006550  004767  174656                          JSR     7,GENPAR        ;GENERATE PARITY
006554  004567  176014                          JSR     5,LINCON        ;CHECK LINE CONNECTION
006560  010177  172422                          MOV     X1,@TXBUF       ;LOAD BUFFER
006564  105777  172414                          TSTB    @TXCSR          ;AND WAIT FOR CHARACTER
006570  100375                                  BPL     .-4             ;TO BE TRANSMITTED
006572  000756                                  BR      PRG2C           ;GET NEXT CHARACTER.
```

```
                                        ;**********
                                        ;PRG3-PROGRAM TO RECEIVE A MESSAGE.
                                        ;**********
006574  104000                  PRG3:   TYPE                    ;TYPE PROGRAM
006576  012562                          P3TIT                   ;TITLE
006600  004567  175042                  JSR     5,LINSEL
006604  004767  175424                  JSR     7,SETPAR        ;GET PARAMETERS
006610  012706  001176          PRG3A:  MOV     #STKPTR-2,%6    ;REPOSITION STACK POINTER
006614  052777  000004  172356          BIS     #BIT2,@RXCSR    ;SET REQUEST TO SEND
006622  004567  175746                  JSR     5,LINCON        ;MAKE LINE CONNECTION
006626  104006                          STRXV                   ;SET RECEIVER INTERUPT
006630  006712                          RINT3                   ;TO THIS ADDRESS
006632  104007                          STTXV                   ;SET TRANSMITTER INTERRUPT
006634  007124                          TINT3                   ;TO THIS ADDRESS
006636  005067  000462                  CLR     WORDS
006642  016700  172366                  MOV     TPVTR,%0
006646  012720  007256                  MOV     #TPINT,(0)+     ;LOAD TELEPRINTER VECTOR
006652  016710  172360                  MOV     TPLVL,(0)       ;AND PRIORITY
006656  012701  014524                  MOV     #OUTBUF,%1      ;GET BUF ADD
006662  052767  100000  000432          BIS     #BIT15,TFLAG    ;SET BIT 15
006670  004767  000614                  JSR     7,TCRLF         ;SEND CRLF
006674  052777  000140  172276          BIS     #140,@RXCSR     ;ENABLE RECEIVER INTERRUPTS
006702  005067  171070                  CLR     PSW
006706  000001                          WAIT                    ;DO
006710  000776                          BR      .-2             ;NOTHING
006712  017767  172262  172450  RINT3:  MOV     @RXCSR,RXCSRT   ;GET RXCSR DATA
006720  100461                          BMI     ERR3A           ;BRANCH IF ERROR
006722  105767  172442                  TSTB    RXCSRT          ;TEST
006726  100064                          BPL     ERR3B
006730  005267  000370                  INC     WORDS
006734  017767  172242  000364          MOV     @RXBUF,RXBUFT   ;GET DATA
006742  116711  000360                  MOVB    RXBUFT,(1)
006746  005767  000354                  TST     RXBUFT
006752  100455                          BMI     ERR3C
006754  105767  170610                  TSTB    SR              ;ECHO OPTION SELECTED
006760  100405                          BMI     RINT3A
006762  105777  172216                  TSTB    @TXCSR
006766  100375                          BPL     .-4
006770  111177  172212                  MOVB    (1),@TXBUF      ;ECHO CHARACTER
006774  026727  000324  001604  RINT3A: CMP     WORDS,#900.     ;END OF BUFFER ALLOWED
007002  001411                          BEQ     RINT3B          ;YES EXIT
007004  005767  000312                  TST     TFLAG           ;IS THIS THE FIRST
007010  100441                          BMI     RINT3E          ;CHARACTER BRANCH IF YES.
007012  121103                          CMPB    (1),%3          ;LAST CHARACTER RECEIVED
007014  001404                          BEQ     RINT3B
007016  122127  000203                  CMPB    (1)+,#203       ;CONTROL C
007022  001401                          BEQ     RINT3B
007024  000002                          RTI                     ;EXIT
```

```
007026  005067  000272          RINT3B: CLR     WORDS
007032  042777  000140  172140          BIC     #140,@RXCSR     ;DISABLE RECEIVER
007040  012701  014525                  MOV     #OUTBUF+1,%1    ;INITIALIZE BUFFER POINTER
007044  010102                          MOV     %1,%2
007046  052777  000100  172130          BIS     #BIT6,@TXCSR    ;ENABLE TRANSMITTER
007054  052777  000100  172142          BIS     #BIT6,@TPS      ; ENABLE TELEPRINTER
007062  000002                          RTI                     ;EXIT
007064  104015                  ERR3A:  ERRRX                   ;TYPE ERROR MESSAGE
007066  013433                          LFAIL                   ;
007070  042777  000140  172102          BIC     #140,@RXCSR     ;DISABLE RECEIVER
007076  000644                          BR      PRG3A
007100  104015                  ERR3B:  ERRRX                   ;TYPE
007102  012256                          RINTM                   ;ERROR MESSAGE
007104  000002                          RTI                     ;EXIT
007106  104015                  ERR3C:  ERRRX
007110  013451                          ROVER
007112  000002                          RTI
                                ;
007114  005067  000202          RINT3E: CLR     TFLAG
007120  112103                          MOVB    (1)+,%3
007122  000002                          RTI
                                ;
007124  017767  172054  172234  TINT3:  MOV     @TXCSR,TXCSRT   ;GET TXCSR DATA
007132  105767  172230                  TSTB    TXCSRT          ;TEST
007136  100016                          BPL     TINT3B
007140  112177  172042                  MOVB    (1)+,@TXBUF     ;TRANSMIT CHARACTER
007144  005267  000154                  INC     WORDS
007150  121103                          CMPB    (1),%3          ;ALL CHARACTERS TRANSMITTED
007152  001431                          BEQ     TINT3C
007154  026727  000144  001604          CMP     WORDS,#900.
007162  001425                          BEQ     TINT3C
007164  121127  000203                  CMPB    (1),#203        ;= CONTROL C
007170  001422                          BEQ     TINT3C
007172  000002                          RTI                     ;RETURN TO MAIN PROGRAM
007174  017767  172024  172170  TINT3B: MOV     @TPS,TEMP       ;SAVE TELEPRINTER STATUS
007202  005077  172016                  CLR     @TPS            ;DISABLE INTERRUPT
007206  105777  172012                  TSTB    @TPS            ;WAIT FOR
007212  100375                          BPL     .-4             ;TELEPRINTER TO FINISH
007214  104014                          ERRTX                   ;TYPE
007216  012277                          TINTM                   ;ERROR MESSAGE
007220  105777  172000                  TSTB    @TPS            ;WAIT FOR TELEPRINTER
007224  100375                          BPL     .-4             ;TO FINISH
007226  016777  172140  171770          MOV     TEMP,@TPS       ;RESTORE TELEPRINTER STATUS
007234  000002                          RTI                     ;EXIT
```

```
                                        ;
007236  042777  000100  171740  TINT3C: BIC     #BIT6,@TXCSR    ;DISABLE INTERRUPT
007244  032777  000100  171752          BIT     #BIT6,@TPS      ;IS TTY ACTIVE
007252  001421                        BEQ     PRG3EX
007254  000002                        RTI
                                        ;
                                        ;
007256  112277  171744          TPINT:  MOVB    (2)+,@TPB       ;TYPE CHARACTER
007262  121203                        CMPB    (2),#3          ;WAS THIS THE LAST CHAR,
007264  001404                        BEQ     TPINTA
007266  121227  000203                CMPB    (2),#203        ;= CONTROL C
007272  001401                        BEQ     TPINTA
007274  000002                        RTI
007276  042777  000100  171720  TPINTA: BIC     #BIT6,@TPS      ;DISABLE INTERRUPT
007304  032777  000100  171672          BIT     #BIT6,@TXCSR    ;IS TRANSMITTER ACTIVE
007312  001401                        BEQ     .+4
007314  000002                        RTI                     ;EXIT
007316  000167  177266          PRG3EX: JMP     PRG3A
007322  000000                  TFLAG:  0
007324  000000                  WORDS:  0
007326  000000                  RXBUFT: 0
```

```
                                        ;**********
                                        ;PRG4-SPECIAL MESSAGE TRANSMIT ONLY THIS PROGRAM TRANSMITS
                                        ;**********
                                        ;MESSAGE SPIRAL PATTERN
                                        ;
007330  104000                  PRG4:   TYPE                    ;TYPE PROGRAM
007332  012620                          P4TIT                   ;TITLE
007334  004567  174306                  JSR     5,LINSEL
007340  004767  174670                  JSR     7,SETPAR        ;GO SET PARAMETERS
007344  052777  000004  171626          BIS     #BIT2,@RXCSR    ;SET REQUEST TO SEND
007352  012767  000110  000126          MOV     #72.,COLMN      ;INIT PAGE WIDTH
007360  012703  000040                  MOV     #40,R3          ;SET LINE START CHAR
007364  004567  175204          PRG4A:  JSR     5,LINCON        ;GO MAKE LINE CONNECTION
007370  004767  000114                  JSR     7,TCRLF
007374  010302                  PRG4B:  MOV     R3,R2           ;GET FIRST CHARACTER
007376  110201                  PRG4C:  MOVB    R2,R1           ;GET CHARACTER
007400  120127  000136                  CMPB    R1,#136         ;TERMINATOR CHARACTER
007404  001003                          BNE     PRG4D           ;RESEND MESSAGE
007406  012702  000040                  MOV     #40,R2
007412  000771                          BR      PRG4C
007414  032767  000100  171752  PRG4D:  BIT     #BIT6,@RT       ;PARITY ENABLED
007422  001402                          BEQ     .+6
007424  004767  174002                  JSR     7,GENPAR        ;GENERATE PARITY
007430  004567  175140                  JSR     5,LINCON        ;CHECK LINE CONNECTION
007434  010177  171546                  MOV     R1,@TXBUF       ;LOAD BUFFER
007440  105777  171540                  TSTB    @TXCSR          ;AND WAIT FOR CHARACTER
007444  100375                          BPL     .-4             ;TO BE TRANSMITTED
007446  005202                          INC     R2              ;SET FOR NEXT CHAR
007450  005367  000032                  DEC     COLMN           ;ALL COLUMNS PRINTED?
007454  001350                          BNE     PRG4C           ;NO, GET NEXT CHAR
007456  012767  000110  000022          MOV     #72.,COLMN      ;RESET COLUMN COUNTER
007464  004767  000020                  JSR     7,TCRLF
007470  005203                          INC     R3              ;UPDATE LINE START CHAR
007472  120327  000136                  CMPB    R3,#136         ;LAST IN SET
007476  001336                          BNE     PRG4B           ;NO
007500  012703  000040                  MOV     #40,R3          ;YES, RESET
007504  000733                          BR      PRG4B           ;GET NEXT CHARACTER.
007506  000000                  COLMN:  0
                                        ;
                                        ;SEND CR LF
                                        ;
007510  112777  000015  171470  TCRLF:  MOVB    #15,@TXBUF      ;SEND CR,LF
007516  105777  171462                  TSTB    @TXCSR
007522  100375                          BPL     .-4
007524  112777  000012  171454          MOVB    #12,@TXBUF
007532  105777  171446                  TSTB    @TXCSR
007536  100375                          BPL     .-4
007540  000207                          RTS     R7
```

```
                                        ;**********
                                        ;PROGRAM 5
                                        ;**********
007542  104000                  PRG5:   TYPE
007544  012667                          P5TIT
007546  004567  174074                  JSR     5,LINSEL
007552  000005                          RESET
007554  004767  174454                  JSR     7,SETPAR
007560  052777  000006  171412          BIS     #6,@RXCSR       ;SET DTR RQ TO SND
007566  104000                  PRG5A:  TYPE                    ;TYPE MESSAGE TO MAKE
007570  013100                          MAKCON                  ;LINE CONNECTION
007572  000000                          HALT                    ;WAIT FOR USER TO MAKE LINE CONNECTION
007574  005777  171402                  TST     @RXBUF          ;READ BUFFER
007600  032777  020000  171372          BIT     #BIT13,@RXCSR   ;TEST FOR CLEAR TO SEND
007606  001003                          BNE     PRG5B
007610  104000                  PRG5AA: TYPE                    ;TYPE ERROR MESSAGE
007612  013226                          LINCHM
007614  000764                          BR      PRG5A           ;AND TRY AGAIN
007616  104000                  PRG5B:  TYPE
007620  013256                          LINMAD
007622  005067  000122                  CLR     ERRCNT
007626  012702  013332          PRG5BB: MOV     #PRG2M,%2       ;GET BASE ADDRESS OF DATA TO BE TRANSMITTED
007632  112201                  PRG5C:  MOVB    (2)+,%1         ;GET A CHARACTER
007634  020127  000045                  CMP     %1,#'%          ;WAS IT THE TERMINATOR?
007640  001440                          BEQ     PRG5E
007642  032767  000100  171524          BIT     #BIT6,$RT       ;WAS PARITY OPTION SELECTED?
007650  001402                          BEQ     .+6             ;BRANCH IF NO PARITY DESIRED
007652  004767  173554                  JSR     7,GENPAR        ;GENERATE PARITY ON CHAR, IN R1
007656  032777  020000  171314          BIT     #BIT13,@RXCSR   ;CHECK CLEAR TO SEND
007664  001751                          BEQ     PRG5AA          ;TYPE ERROR MSG, IF NOT SET
007666  010177  171314                  MOV     %1,@TXBUF       ;TRANSMIT THE CHARACTER
007672  005777  171304                  TST     @RXBUF          ;ANY ERROR FLAGS?
007676  100001                          BPL     .+4             ;BRANCH IF NO ERROR FLAGS
007700  104003                          ERROR                   ;ERROR! SOME ERROR FLAG IS SET
007702  105777  171272                  TSTB    @RXCSR          ;WAIT FOR THE RECEIVER TO RECEIVE
007706  100375                          BPL     .-4             ;THE TRANSMITTED CHARACTER
007710  117703  171266                  MOVB    @RXBUF,%3       ;SAVE IT IN R3
007714  046701  171442                  BIC     CARMSK,%1       ;CLEAR NON- TRANSMITTED BITS
007720  120103                          CMPB    %1,%3           ;WAS RECEIVED & TRANSMITTED DATA THE SAME
007722  001403                          BEQ     PRG5D
007724  104003                          ERROR                   ;ERROR! DATA ERROR
007726  005267  000016                  INC     ERRCNT
007732  105777  171246          PRG5D:  TSTB    @TXCSR          ;WAIT FOR TRANSMITTER TO FINISH
007736  100375                          BPL     .-4
007740  000734                          BR      PRG5C
007742  104000                  PRG5E:  TYPE
007744  013177                          ENDPAS
007746  000727                          BR      PRG5BB
007750  000000                  ERRCNT: OPEN
```

```
                                        ;THIS ROUTINE MOVES THE CONTENTS OF R2 TO THE ADDRESS SPECIFIED
                                        ;BY R1
007752  012767  000006  170024  MOVIT:  MOV     #6,4            ;SET UP FOR RETURN
007760  012767  000002  170020          MOV     #2,6
007766  012700  000037                  MOV     #31.,%0         ;GET COUNTER
007772  010231                  MOVITA: MOV     %2,@(1)+                ;MOVE THE DATA
007774  005300                          DEC     %0              ;ALL DATA MOVED?
007776  001375                          BNE     MOVITA          ;NO.  RETURN
010000  012767  004352  167776          MOV     #ERTP,MACHER
010006  012767  000040  167772          MOV     #40,MACHER+2
010014  000205                          RTS     5               ;RETURN
                                        ;
                                        ;SUBROUTINE TO LOAD ALL VECTORS
010016  012701  010656          LDVECS: MOV     #RISR0,%1
010022  012702  010170                  MOV     #VECTAB,%2
010026  012703  000010                  MOV     #10,%3
010032  012704  000037                  MOV     #31.,%4
010036  032712  000001          LDVECB: BIT     #BIT0,(2)               ;DOES THIS VECTOR EXIST
010042  001002                          BNE     LDVEC1          ;NO, SKIP LOADING
010044  010172  000000                  MOV     %1,@(2)         ;LOAD VECTOR
010050  060301          LDVEC1: ADD     %3,%1
010052  005722                  TST     (2)+
010054  005304                  DEC     %4
010056  001367                  BNE     LDVECB
010060  000207                  RTS     7
                                        ;
010062  012701  011246          LDTVEC: MOV     #TISR0,%1
010066  012702  010170                  MOV     #VECTAB,%2
010072  012703  000010                  MOV     #10,%3
010076  012704  000037                  MOV     #31.,%4
010102  032712  000001          LDTVED: BIT     #BIT0,(2)               ;DOES THIS VECTOR EXIST
010106  001003                          BNE     LDVEC2          ;NO, SKIP LOADING
010110  011200                          MOV     (2),%0
010112  010160  000004                  MOV     %1,4(0)
010116  060301          LDVEC2: ADD     %3,%1
010120  005722                  TST     (2)+
010122  005304                  DEC     %4
010124  001366                  BNE     LDTVED
010126  000207                  RTS     7
```

```
                                        ;
                                        ;ROUTINE TO LOAD PRIORITY LEVEL 7 IN VECTOR +2
010130  012701  010170        LDPRI:  MOV     #VECTAB,%1      ;GET BASE VECTOR
010134  012702  000340                MOV     #340,%2         ;GET LEVEL 7
010140  012703  000037                MOV     #31.,%3         ;LOAD COUNTER
010144  032711  000001        LDPRIA: BIT     #BIT0,(1)               ;DOES THIS VECTOR EXIST
010150  001003                        BNE     LDPRIX          ;NO SKIP LOADING
010152  011104                        MOV     (1),%4          ;LOAD VECTOR +2
010154  010264  000002                MOV     %2,2(4)
010160  005721                LDPRIX: TST     (1)+            ;POINT TO NEXT VECTOR
010162  005303                        DEC     %3              ;DECREMENT COUNTER
010164  001367                        BNE     LDPRIA
010166  000207                        RTS     7
                                        ;VECTOR ASSIGNMENT TABLE
010170  000301                VECTAB: 301                     ;LINE 0 VECTOR
010172  000311                        311                     ;LINE 1 VECTOR
010174  000321                        321                     ;LINE 2 VECTOR
010176  000331                        331                     ;LINE 3 VECTOR
010200  000341                        341                     ;LINE 4 VECTOR
010202  000351                        351                     ;LINE 5 VECTOR
010204  000361                        361                     ;LINE 6 VECTOR
010206  000371                        371                     ;LINE 7 VECTOR
010210  000401                        401                     ;LINE 10 VECTOR
010212  000411                        411                     ;LINE 11 VECTOR
010214  000421                        421                     ;LINE 12 VECTOR
010216  000431                        431                     ;LINE 13 VECTOR
010220  000441                        441                     ;LINE 14 VECTOR
010222  000451                        451                     ;LINE 15 VECTOR
010224  000461                        461                     ;LINE 16 VECTOR
010226  000471                        471                     ;LINE 17 VECTOR
010230  000501                        501                     ;LINE 20 VECTOR
010232  000511                        511                     ;LINE 21 VECTOR
010234  000521                        521                     ;LINE 22 VECTOR
010236  000531                        531                     ;LINE 23 VECTOR
010240  000541                        541                     ;LINE 24 VECTOR
010242  000551                        551                     ;LINE 25 VECTOR
010244  000561                        561                     ;LINE 26 VECTOR
010246  000571                        571                     ;LINE 27 VECTOR
010250  000601                        601                     ;LINE 30 VECTOR
010252  000611                        611                     ;LINE 31 VECTOR
010254  000621                        621                     ;LINE 32 VECTOR
010256  000631                        631                     ;LINE 33 VECTOR
010260  000641                        641                     ;LINE 34 VECTOR
010262  000651                        651                     ;LINE 35 VECTOR
010264  000661                        661                     ;LINE 36 VECTOR
```

```
                                ;DL11-E REGISTER ADDRESSES
                        000000          N=0
                        000000          A=0
                                RCSR:   .REPT   31.
                                        RRCV    \N,\A
                                        N=N+10
                                        A=A+1
                                        .ENDR
                                        RRCV    \N,\A
010266  175610                          175610+0                ;ADDRESS OF RECEIVER LINE # 0
        000010                          N=N+10
        000001                          A=A+1
                                        RRCV    \N,\A
010270  175620                          175610+10               ;ADDRESS OF RECEIVER LINE # 1
        000020                          N=N+10
        000002                          A=A+1
                                        RRCV    \N,\A
010272  175630                          175610+20               ;ADDRESS OF RECEIVER LINE # 2
        000030                          N=N+10
        000003                          A=A+1
                                        RRCV    \N,\A
010274  175640                          175610+30               ;ADDRESS OF RECEIVER LINE # 3
        000040                          N=N+10
        000004                          A=A+1
                                        RRCV    \N,\A
010276  175650                          175610+40               ;ADDRESS OF RECEIVER LINE # 4
        000050                          N=N+10
        000005                          A=A+1
                                        RRCV    \N,\A
010300  175660                          175610+50               ;ADDRESS OF RECEIVER LINE # 5
        000060                          N=N+10
        000006                          A=A+1
                                        RRCV    \N,\A
010302  175670                          175610+60               ;ADDRESS OF RECEIVER LINE # 6
        000070                          N=N+10
        000007                          A=A+1
                                        RRCV    \N,\A
010304  175700                          175610+70               ;ADDRESS OF RECEIVER LINE # 7
        000100                          N=N+10
        000010                          A=A+1
                                        RRCV    \N,\A
010306  175710                          175610+100              ;ADDRESS OF RECEIVER LINE # 10
        000110                          N=N+10
        000011                          A=A+1
                                        RRCV    \N,\A
010310  175720                          175610+110              ;ADDRESS OF RECEIVER LINE # 11
        000120                          N=N+10
        000012                          A=A+1
                                        RRCV    \N,\A
010312  175730                          175610+120              ;ADDRESS OF RECEIVER LINE # 12
        000130                          N=N+10
        000013                          A=A+1
                                        RRCV    \N,\A
010314  175740                          175610+130              ;ADDRESS OF RECEIVER LINE # 13
        000140                          N=N+10
```

```
                000014                          A=A+1
                                                RRCV    \N,\A
010316          175750                          175610+140              ;ADDRESS OF RECEIVER LINE # 14
                000150                          N=N+10
                000015                          A=A+1
                                                RRCV    \N,\A
010320          175760                          175610+150              ;ADDRESS OF RECEIVER LINE # 15
                000160                          N=N+10
                000016                          A=A+1
                                                RRCV    \N,\A
010322          175770                          175610+160              ;ADDRESS OF RECEIVER LINE # 16
                000170                          N=N+10
                000017                          A=A+1
                                                RRCV    \N,\A
010324          176000                          175610+170              ;ADDRESS OF RECEIVER LINE # 17
                000200                          N=N+10
                000020                          A=A+1
                                                RRCV    \N,\A
010326          176010                          175610+200              ;ADDRESS OF RECEIVER LINE # 20
                000210                          N=N+10
                000021                          A=A+1
                                                RRCV    \N,\A
010330          176020                          175610+210              ;ADDRESS OF RECEIVER LINE # 21
                000220                          N=N+10
                000022                          A=A+1
                                                RRCV    \N,\A
010332          176030                          175610+220              ;ADDRESS OF RECEIVER LINE # 22
                000230                          N=N+10
                000023                          A=A+1
                                                RRCV    \N,\A
010334          176040                          175610+230              ;ADDRESS OF RECEIVER LINE # 23
                000240                          N=N+10
                000024                          A=A+1
                                                RRCV    \N,\A
010336          176050                          175610+240              ;ADDRESS OF RECEIVER LINE # 24
                000250                          N=N+10
                000025                          A=A+1
                                                RRCV    \N,\A
010340          176060                          175610+250              ;ADDRESS OF RECEIVER LINE # 25
                000260                          N=N+10
                000026                          A=A+1
                                                RRCV    \N,\A
010342          176070                          175610+260              ;ADDRESS OF RECEIVER LINE # 26
                000270                          N=N+10
                000027                          A=A+1
                                                RRCV    \N,\A
010344          176100                          175610+270              ;ADDRESS OF RECEIVER LINE # 27
                000300                          N=N+10
                000030                          A=A+1
                                                RRCV    \N,\A
010346          176110                          175610+300              ;ADDRESS OF RECEIVER LINE # 30
                000310                          N=N+10
                000031                          A=A+1
                                                RRCV    \N,\A
010350          176120                          175610+310              ;ADDRESS OF RECEIVER LINE # 31
```

```
                000320                          N=N+10
                000032                          A=A+1
                                                RRCV    \N,\A
010352          176130                          175610+320              ;ADDRESS OF RECEIVER LINE # 32
                000330                          N=N+10
                000033                          A=A+1
                                                RRCV    \N,\A
010354          176140                          175610+330              ;ADDRESS OF RECEIVER LINE # 33
                000340                          N=N+10
                000034                          A=A+1
                                                RRCV    \N,\A
010356          176150                          175610+340              ;ADDRESS OF RECEIVER LINE # 34
                000350                          N=N+10
                000035                          A=A+1
                                                RRCV    \N,\A
010360          176160                          175610+350              ;ADDRESS OF RECEIVER LINE # 35
                000360                          N=N+10
                000036                          A=A+1
                                                RRCV    \N,\A
010362          176170                          175610+360              ;ADDRESS OF RECEIVER LINE # 36
                000370                          N=N+10
                000037                          A=A+1
```

```
                000000                          N=0
                000000                          A=0
                                        RBUF:   .REPT   31.
                                                RBUFF   \N,\A
                                                N=N+10
                                                A=A+1
                                                .ENDR
                                                RBUFF   \N,\A
          010364  175612                        175612+0        ;ADDRESS OF RECEIVER BUFFER LINE # 0
                  000010                        N=N+10
                  000001                        A=A+1
                                                RBUFF   \N,\A
          010366  175622                        175612+10       ;ADDRESS OF RECEIVER BUFFER LINE # 1
                  000020                        N=N+10
                  000002                        A=A+1
                                                RBUFF   \N,\A
          010370  175632                        175612+20       ;ADDRESS OF RECEIVER BUFFER LINE # 2
                  000030                        N=N+10
                  000003                        A=A+1
                                                RBUFF   \N,\A
          010372  175642                        175612+30       ;ADDRESS OF RECEIVER BUFFER LINE # 3
                  000040                        N=N+10
                  000004                        A=A+1
                                                RBUFF   \N,\A
          010374  175652                        175612+40       ;ADDRESS OF RECEIVER BUFFER LINE # 4
                  000050                        N=N+10
                  000005                        A=A+1
                                                RBUFF   \N,\A
          010376  175662                        175612+50       ;ADDRESS OF RECEIVER BUFFER LINE # 5
                  000060                        N=N+10
                  000006                        A=A+1
                                                RBUFF   \N,\A
          010400  175672                        175612+60       ;ADDRESS OF RECEIVER BUFFER LINE # 6
                  000070                        N=N+10
                  000007                        A=A+1
                                                RBUFF   \N,\A
          010402  175702                        175612+70       ;ADDRESS OF RECEIVER BUFFER LINE # 7
                  000100                        N=N+10
                  000010                        A=A+1
                                                RBUFF   \N,\A
          010404  175712                        175612+100      ;ADDRESS OF RECEIVER BUFFER LINE # 10
                  000110                        N=N+10
                  000011                        A=A+1
                                                RBUFF   \N,\A
          010406  175722                        175612+110      ;ADDRESS OF RECEIVER BUFFER LINE # 11
                  000120                        N=N+10
                  000012                        A=A+1
                                                RBUFF   \N,\A
          010410  175732                        175612+120      ;ADDRESS OF RECEIVER BUFFER LINE # 12
                  000130                        N=N+10
                  000013                        A=A+1
                                                RBUFF   \N,\A
          010412  175742                        175612+130      ;ADDRESS OF RECEIVER BUFFER LINE # 13
                  000140                        N=N+10
                  000014                        A=A+1
```

```
                                        RBUFF   \N,\A
010414  175752                          175612+140              ;ADDRESS OF RECEIVER BUFFER LINE # 14
        000150                          N=N+10
        000015                          A=A+1
                                        RBUFF   \N,\A
010416  175762                          175612+150              ;ADDRESS OF RECEIVER BUFFER LINE # 15
        000160                          N=N+10
        000016                          A=A+1
                                        RBUFF   \N,\A
010420  175772                          175612+160              ;ADDRESS OF RECEIVER BUFFER LINE # 16
        000170                          N=N+10
        000017                          A=A+1
                                        RBUFF   \N,\A
010422  176002                          175612+170              ;ADDRESS OF RECEIVER BUFFER LINE # 17
        000200                          N=N+10
        000020                          A=A+1
                                        RBUFF   \N,\A
010424  176012                          175612+200              ;ADDRESS OF RECEIVER BUFFER LINE # 20
        000210                          N=N+10
        000021                          A=A+1
                                        RBUFF   \N,\A
010426  176022                          175612+210              ;ADDRESS OF RECEIVER BUFFER LINE # 21
        000220                          N=N+10
        000022                          A=A+1
                                        RBUFF   \N,\A
010430  176032                          175612+220              ;ADDRESS OF RECEIVER BUFFER LINE # 22
        000230                          N=N+10
        000023                          A=A+1
                                        RBUFF   \N,\A
010432  176042                          175612+230              ;ADDRESS OF RECEIVER BUFFER LINE # 23
        000240                          N=N+10
        000024                          A=A+1
                                        RBUFF   \N,\A
010434  176052                          175612+240              ;ADDRESS OF RECEIVER BUFFER LINE # 24
        000250                          N=N+10
        000025                          A=A+1
                                        RBUFF   \N,\A
010436  176062                          175612+250              ;ADDRESS OF RECEIVER BUFFER LINE # 25
        000260                          N=N+10
        000026                          A=A+1
                                        RBUFF   \N,\A
010440  176072                          175612+260              ;ADDRESS OF RECEIVER BUFFER LINE # 26
        000270                          N=N+10
        000027                          A=A+1
                                        RBUFF   \N,\A
010442  176102                          175612+270              ;ADDRESS OF RECEIVER BUFFER LINE # 27
        000300                          N=N+10
        000030                          A=A+1
                                        RBUFF   \N,\A
010444  176112                          175612+300              ;ADDRESS OF RECEIVER BUFFER LINE # 30
        000310                          N=N+10
        000031                          A=A+1
                                        RBUFF   \N,\A
010446  176122                          175612+310              ;ADDRESS OF RECEIVER BUFFER LINE # 31
        000320                          N=N+10
```

```
                000032                          A=A+1
                                                RBUFF   \N,\A
010450          176132                          175612+320          ;ADDRESS OF RECEIVER BUFFER LINE # 32
                000330                          N=N+10
                000033                          A=A+1
                                                RBUFF   \N,\A
010452          176142                          175612+330          ;ADDRESS OF RECEIVER BUFFER LINE # 33
                000340                          N=N+10
                000034                          A=A+1
                                                RBUFF   \N,\A
010454          176152                          175612+340          ;ADDRESS OF RECEIVER BUFFER LINE # 34
                000350                          N=N+10
                000035                          A=A+1
                                                RBUFF   \N,\A
010456          176162                          175612+350          ;ADDRESS OF RECEIVER BUFFER LINE # 35
                000360                          N=N+10
                000036                          A=A+1
                                                RBUFF   \N,\A
010460          176172                          175612+360          ;ADDRESS OF RECEIVER BUFFER LINE # 36
                000370                          N=N+10
                000037                          A=A+1
```

```
                000000                          N=0
                000000                          A=0
                                        TCSR:   .REPT   31.
                                                TXMT    \N,\A
                                                N=N+10
                                                A=A+1
                                                .ENDR
                                                TXMT    \N,\A
010462          175614                          175614+0        ;ADDRESS OF TRANSMITTER CSR LINE # 0
                000010                          N=N+10
                000001                          A=A+1
                                                TXMT    \N,\A
010464          175624                          175614+10       ;ADDRESS OF TRANSMITTER CSR LINE # 1
                000020                          N=N+10
                000002                          A=A+1
                                                TXMT    \N,\A
010466          175634                          175614+20       ;ADDRESS OF TRANSMITTER CSR LINE # 2
                000030                          N=N+10
                000003                          A=A+1
                                                TXMT    \N,\A
010470          175644                          175614+30       ;ADDRESS OF TRANSMITTER CSR LINE # 3
                000040                          N=N+10
                000004                          A=A+1
                                                TXMT    \N,\A
010472          175654                          175614+40       ;ADDRESS OF TRANSMITTER CSR LINE # 4
                000050                          N=N+10
                000005                          A=A+1
                                                TXMT    \N,\A
010474          175664                          175614+50       ;ADDRESS OF TRANSMITTER CSR LINE # 5
                000060                          N=N+10
                000006                          A=A+1
                                                TXMT    \N,\A
010476          175674                          175614+60       ;ADDRESS OF TRANSMITTER CSR LINE # 6
                000070                          N=N+10
                000007                          A=A+1
                                                TXMT    \N,\A
010500          175704                          175614+70       ;ADDRESS OF TRANSMITTER CSR LINE # 7
                000100                          N=N+10
                000010                          A=A+1
                                                TXMT    \N,\A
010502          175714                          175614+100      ;ADDRESS OF TRANSMITTER CSR LINE # 10
                000110                          N=N+10
                000011                          A=A+1
                                                TXMT    \N,\A
010504          175724                          175614+110      ;ADDRESS OF TRANSMITTER CSR LINE # 11
                000120                          N=N+10
                000012                          A=A+1
                                                TXMT    \N,\A
010506          175734                          175614+120      ;ADDRESS OF TRANSMITTER CSR LINE # 12
                000130                          N=N+10
                000013                          A=A+1
                                                TXMT    \N,\A
010510          175744                          175614+130      ;ADDRESS OF TRANSMITTER CSR LINE # 13
                000140                          N=N+10
                000014                          A=A+1
```

```
                                        TXMT    \N,\A
010512  175754                          175614+140          ;ADDRESS OF TRANSMITTER CSR LINE # 14
        000150                          N=N+10
        000015                          A=A+1
                                        TXMT    \N,\A
010514  175764                          175614+150          ;ADDRESS OF TRANSMITTER CSR LINE # 15
        000160                          N=N+10
        000016                          A=A+1
                                        TXMT    \N,\A
010516  175774                          175614+160          ;ADDRESS OF TRANSMITTER CSR LINE # 16
        000170                          N=N+10
        000017                          A=A+1
                                        TXMT    \N,\A
010520  176004                          175614+170          ;ADDRESS OF TRANSMITTER CSR LINE # 17
        000200                          N=N+10
        000020                          A=A+1
                                        TXMT    \N,\A
010522  176014                          175614+200          ;ADDRESS OF TRANSMITTER CSR LINE # 20
        000210                          N=N+10
        000021                          A=A+1
                                        TXMT    \N,\A
010524  176024                          175614+210          ;ADDRESS OF TRANSMITTER CSR LINE # 21
        000220                          N=N+10
        000022                          A=A+1
                                        TXMT    \N,\A
010526  176034                          175614+220          ;ADDRESS OF TRANSMITTER CSR LINE # 22
        000230                          N=N+10
        000023                          A=A+1
                                        TXMT    \N,\A
010530  176044                          175614+230          ;ADDRESS OF TRANSMITTER CSR LINE # 23
        000240                          N=N+10
        000024                          A=A+1
                                        TXMT    \N,\A
010532  176054                          175614+240          ;ADDRESS OF TRANSMITTER CSR LINE # 24
        000250                          N=N+10
        000025                          A=A+1
                                        TXMT    \N,\A
010534  176064                          175614+250          ;ADDRESS OF TRANSMITTER CSR LINE # 25
        000260                          N=N+10
        000026                          A=A+1
                                        TXMT    \N,\A
010536  176074                          175614+260          ;ADDRESS OF TRANSMITTER CSR LINE # 26
        000270                          N=N+10
        000027                          A=A+1
                                        TXMT    \N,\A
010540  176104                          175614+270          ;ADDRESS OF TRANSMITTER CSR LINE # 27
        000300                          N=N+10
        000030                          A=A+1
                                        TXMT    \N,\A
010542  176114                          175614+300          ;ADDRESS OF TRANSMITTER CSR LINE # 30
        000310                          N=N+10
        000031                          A=A+1
                                        TXMT    \N,\A
010544  176124                          175614+310          ;ADDRESS OF TRANSMITTER CSR LINE # 31
        000320                          N=N+10
```

```
                000032                          A=A+1
                                                TXMT    \N,\A
010546          176134                          175614+320              ;ADDRESS OF TRANSMITTER CSR LINE # 32
                000330                          N=N+10
                000033                          A=A+1
                                                TXMT    \N,\A
010550          176144                          175614+330              ;ADDRESS OF TRANSMITTER CSR LINE # 33
                000340                          N=N+10
                000034                          A=A+1
                                                TXMT    \N,\A
010552          176154                          175614+340              ;ADDRESS OF TRANSMITTER CSR LINE # 34
                000350                          N=N+10
                000035                          A=A+1
                                                TXMT    \N,\A
010554          176164                          175614+350              ;ADDRESS OF TRANSMITTER CSR LINE # 35
                000360                          N=N+10
                000036                          A=A+1
                                                TXMT    \N,\A
010556          176174                          175614+360              ;ADDRESS OF TRANSMITTER CSR LINE # 36
                000370                          N=N+10
                000037                          A=A+1
```

```
                000000                          N=0
                000000                          A=0
                                        TBUF:   .REPT   31.
                                                TBUFF   \N,\A
                                                N=N+10
                                                A=A+1
                                                .ENDR
                                                TBUFF   \N,\A
        010560  175616                          175616+0        ;ADDRESS OF TRANSMIT BUFFER LINE # 0
                000010                          N=N+10
                000001                          A=A+1
                                                TBUFF   \N,\A
        010562  175626                          175616+10       ;ADDRESS OF TRANSMIT BUFFER LINE # 1
                000020                          N=N+10
                000002                          A=A+1
                                                TBUFF   \N,\A
        010564  175636                          175616+20       ;ADDRESS OF TRANSMIT BUFFER LINE # 2
                000030                          N=N+10
                000003                          A=A+1
                                                TBUFF   \N,\A
        010566  175646                          175616+30       ;ADDRESS OF TRANSMIT BUFFER LINE # 3
                000040                          N=N+10
                000004                          A=A+1
                                                TBUFF   \N,\A
        010570  175656                          175616+40       ;ADDRESS OF TRANSMIT BUFFER LINE # 4
                000050                          N=N+10
                000005                          A=A+1
                                                TBUFF   \N,\A
        010572  175666                          175616+50       ;ADDRESS OF TRANSMIT BUFFER LINE # 5
                000060                          N=N+10
                000006                          A=A+1
                                                TBUFF   \N,\A
        010574  175676                          175616+60       ;ADDRESS OF TRANSMIT BUFFER LINE # 6
                000070                          N=N+10
                000007                          A=A+1
                                                TBUFF   \N,\A
        010576  175706                          175616+70       ;ADDRESS OF TRANSMIT BUFFER LINE # 7
                000100                          N=N+10
                000010                          A=A+1
                                                TBUFF   \N,\A
        010600  175716                          175616+100      ;ADDRESS OF TRANSMIT BUFFER LINE # 10
                000110                          N=N+10
                000011                          A=A+1
                                                TBUFF   \N,\A
        010602  175726                          175616+110      ;ADDRESS OF TRANSMIT BUFFER LINE # 11
                000120                          N=N+10
                000012                          A=A+1
                                                TBUFF   \N,\A
        010604  175736                          175616+120      ;ADDRESS OF TRANSMIT BUFFER LINE # 12
                000130                          N=N+10
                000013                          A=A+1
                                                TBUFF   \N,\A
        010606  175746                          175616+130      ;ADDRESS OF TRANSMIT BUFFER LINE # 13
                000140                          N=N+10
                000014                          A=A+1
```

```
                                        TBUFF   \N,\A
010610  175756                          175616+140              ;ADDRESS OF TRANSMIT BUFFER LINE # 14
        000150                          N=N+10
        000015                          A=A+1
                                        TBUFF   \N,\A
010612  175766                          175616+150              ;ADDRESS OF TRANSMIT BUFFER LINE # 15
        000160                          N=N+10
        000016                          A=A+1
                                        TBUFF   \N,\A
010614  175776                          175616+160              ;ADDRESS OF TRANSMIT BUFFER LINE # 16
        000170                          N=N+10
        000017                          A=A+1
                                        TBUFF   \N,\A
010616  176006                          175616+170              ;ADDRESS OF TRANSMIT BUFFER LINE # 17
        000200                          N=N+10
        000020                          A=A+1
                                        TBUFF   \N,\A
010620  176016                          175616+200              ;ADDRESS OF TRANSMIT BUFFER LINE # 20
        000210                          N=N+10
        000021                          A=A+1
                                        TBUFF   \N,\A
010622  176026                          175616+210              ;ADDRESS OF TRANSMIT BUFFER LINE # 21
        000220                          N=N+10
        000022                          A=A+1
                                        TBUFF   \N,\A
010624  176036                          175616+220              ;ADDRESS OF TRANSMIT BUFFER LINE # 22
        000230                          N=N+10
        000023                          A=A+1
                                        TBUFF   \N,\A
010626  176046                          175616+230              ;ADDRESS OF TRANSMIT BUFFER LINE # 23
        000240                          N=N+10
        000024                          A=A+1
                                        TBUFF   \N,\A
010630  176056                          175616+240              ;ADDRESS OF TRANSMIT BUFFER LINE # 24
        000250                          N=N+10
        000025                          A=A+1
                                        TBUFF   \N,\A
010632  176066                          175616+250              ;ADDRESS OF TRANSMIT BUFFER LINE # 25
        000260                          N=N+10
        000026                          A=A+1
                                        TBUFF   \N,\A
010634  176076                          175616+260              ;ADDRESS OF TRANSMIT BUFFER LINE # 26
        000270                          N=N+10
        000027                          A=A+1
                                        TBUFF   \N,\A
010636  176106                          175616+270              ;ADDRESS OF TRANSMIT BUFFER LINE # 27
        000300                          N=N+10
        000030                          A=A+1
                                        TBUFF   \N,\A
010640  176116                          175616+300              ;ADDRESS OF TRANSMIT BUFFER LINE # 30
        000310                          N=N+10
        000031                          A=A+1
                                        TBUFF   \N,\A
010642  176126                          175616+310              ;ADDRESS OF TRANSMIT BUFFER LINE # 31
        000320                          N=N+10
```

```
                000032                          A=A+1
                                                TBUFF   \N,\A
010644          176136                          175616+320              ;ADDRESS OF TRANSMIT BUFFER LINE # 32
                000330                          N=N+10
                000033                          A=A+1
                                                TBUFF   \N,\A
010646          176146                          175616+330              ;ADDRESS OF TRANSMIT BUFFER LINE # 33
                000340                          N=N+10
                000034                          A=A+1
                                                TBUFF   \N,\A
010650          176156                          175616+340              ;ADDRESS OF TRANSMIT BUFFER LINE # 34
                000350                          N=N+10
                000035                          A=A+1
                                                TBUFF   \N,\A
010652          176166                          175616+350              ;ADDRESS OF TRANSMIT BUFFER LINE # 35
                000360                          N=N+10
                000036                          A=A+1
                                                TBUFF   \N,\A
010654          176176                          175616+360              ;ADDRESS OF TRANSMIT BUFFER LINE # 36
                000370                          N=N+10
                000037                          A=A+1
```

```
                000000                          N=0
                                                .REPT   31.
                                                ISR     \N
                                                N=N+1
                                                .ENDR
                                                ISR     \N
010656  012700  000000          RISR0:  MOV     #0,%0
010662  000167  174070                  JMP     RISR            ;GO TO COMMON INTERRUPT SERVICE ROUTINE

                000001                          N=N+1
                                                ISR     \N
010666  012700  000001          RISR1:  MOV     #1,%0
010672  000167  174060                  JMP     RISR            ;GO TO COMMON INTERRUPT SERVICE ROUTINE

                000002                          N=N+1
                                                ISR     \N
010676  012700  000002          RISR2:  MOV     #2,%0
010702  000167  174050                  JMP     RISR            ;GO TO COMMON INTERRUPT SERVICE ROUTINE

                000003                          N=N+1
                                                ISR     \N
010706  012700  000003          RISR3:  MOV     #3,%0
010712  000167  174040                  JMP     RISR            ;GO TO COMMON INTERRUPT SERVICE ROUTINE

                000004                          N=N+1
                                                ISR     \N
010716  012700  000004          RISR4:  MOV     #4,%0
010722  000167  174030                  JMP     RISR            ;GO TO COMMON INTERRUPT SERVICE ROUTINE

                000005                          N=N+1
                                                ISR     \N
010726  012700  000005          RISR5:  MOV     #5,%0
010732  000167  174020                  JMP     RISR            ;GO TO COMMON INTERRUPT SERVICE ROUTINE

                000006                          N=N+1
                                                ISR     \N
010736  012700  000006          RISR6:  MOV     #6,%0
010742  000167  174010                  JMP     RISR            ;GO TO COMMON INTERRUPT SERVICE ROUTINE

                000007                          N=N+1
                                                ISR     \N
010746  012700  000007          RISR7:  MOV     #7,%0
010752  000167  174000                  JMP     RISR            ;GO TO COMMON INTERRUPT SERVICE ROUTINE

                000010                          N=N+1
                                                ISR     \N
010756  012700  000010          RISR10: MOV     #10,%0
010762  000167  173770                  JMP     RISR            ;GO TO COMMON INTERRUPT SERVICE ROUTINE

                000011                          N=N+1
                                                ISR     \N
010766  012700  000011          RISR11: MOV     #11,%0
010772  000167  173760                  JMP     RISR            ;GO TO COMMON INTERRUPT SERVICE ROUTINE

                000012                          N=N+1
```

```
                                        ISR     \N
010776  012700  000012          RISR12: MOV     #12,%0
011002  000167  173750                  JMP     RISR            ;GO TO COMMON INTERRUPT SERVICE ROUTINE

        000013                          N=N+1
                                        ISR     \N
011006  012700  000013          RISR13: MOV     #13,%0
011012  000167  173740                  JMP     RISR            ;GO TO COMMON INTERRUPT SERVICE ROUTINE

        000014                          N=N+1
                                        ISR     \N
011016  012700  000014          RISR14: MOV     #14,%0
011022  000167  173730                  JMP     RISR            ;GO TO COMMON INTERRUPT SERVICE ROUTINE

        000015                          N=N+1
                                        ISR     \N
011026  012700  000015          RISR15: MOV     #15,%0
011032  000167  173720                  JMP     RISR            ;GO TO COMMON INTERRUPT SERVICE ROUTINE

        000016                          N=N+1
                                        ISR     \N
011036  012700  000016          RISR16: MOV     #16,%0
011042  000167  173710                  JMP     RISR            ;GO TO COMMON INTERRUPT SERVICE ROUTINE

        000017                          N=N+1
                                        ISR     \N
011046  012700  000017          RISR17: MOV     #17,%0
011052  000167  173700                  JMP     RISR            ;GO TO COMMON INTERRUPT SERVICE ROUTINE

        000020                          N=N+1
                                        ISR     \N
011056  012700  000020          RISR20: MOV     #20,%0
011062  000167  173670                  JMP     RISR            ;GO TO COMMON INTERRUPT SERVICE ROUTINE

        000021                          N=N+1
                                        ISR     \N
011066  012700  000021          RISR21: MOV     #21,%0
011072  000167  173660                  JMP     RISR            ;GO TO COMMON INTERRUPT SERVICE ROUTINE

        000022                          N=N+1
                                        ISR     \N
011076  012700  000022          RISR22: MOV     #22,%0
011102  000167  173650                  JMP     RISR            ;GO TO COMMON INTERRUPT SERVICE ROUTINE

        000023                          N=N+1
                                        ISR     \N
011106  012700  000023          RISR23: MOV     #23,%0
011112  000167  173640                  JMP     RISR            ;GO TO COMMON INTERRUPT SERVICE ROUTINE

        000024                          N=N+1
                                        ISR     \N
011116  012700  000024          RISR24: MOV     #24,%0
011122  000167  173630                  JMP     RISR            ;GO TO COMMON INTERRUPT SERVICE ROUTINE

        000025                          N=N+1
```

```
                                        ISR     \N
011126  012700  000025          RISR25: MOV     #25,%0
011132  000167  173620                  JMP     RISR            ;GO TO COMMON INTERRUPT SERVICE ROUTINE

        000026                          N=N+1
                                        ISR     \N
011136  012700  000026          RISR26: MOV     #26,%0
011142  000167  173610                  JMP     RISR            ;GO TO COMMON INTERRUPT SERVICE ROUTINE

        000027                          N=N+1
                                        ISR     \N
011146  012700  000027          RISR27: MOV     #27,%0
011152  000167  173600                  JMP     RISR            ;GO TO COMMON INTERRUPT SERVICE ROUTINE

        000030                          N=N+1
                                        ISR     \N
011156  012700  000030          RISR30: MOV     #30,%0
011162  000167  173570                  JMP     RISR            ;GO TO COMMON INTERRUPT SERVICE ROUTINE

        000031                          N=N+1
                                        ISR     \N
011166  012700  000031          RISR31: MOV     #31,%0
011172  000167  173560                  JMP     RISR            ;GO TO COMMON INTERRUPT SERVICE ROUTINE

        000032                          N=N+1
                                        ISR     \N
011176  012700  000032          RISR32: MOV     #32,%0
011202  000167  173550                  JMP     RISR            ;GO TO COMMON INTERRUPT SERVICE ROUTINE

        000033                          N=N+1
                                        ISR     \N
011206  012700  000033          RISR33: MOV     #33,%0
011212  000167  173540                  JMP     RISR            ;GO TO COMMON INTERRUPT SERVICE ROUTINE

        000034                          N=N+1
                                        ISR     \N
011216  012700  000034          RISR34: MOV     #34,%0
011222  000167  173530                  JMP     RISR            ;GO TO COMMON INTERRUPT SERVICE ROUTINE

        000035                          N=N+1
                                        ISR     \N
011226  012700  000035          RISR35: MOV     #35,%0
011232  000167  173520                  JMP     RISR            ;GO TO COMMON INTERRUPT SERVICE ROUTINE

        000036                          N=N+1
                                        ISR     \N
011236  012700  000036          RISR36: MOV     #36,%0
011242  000167  173510                  JMP     RISR            ;GO TO COMMON INTERRUPT SERVICE ROUTINE

        000037                          N=N+1
```

```
                000000                          N=0
                                                .REPT   32.
                                                ISRT    \N
                                                N=N+1
                                                .ENDR
                                                ISRT    \N
011246  012700  000000          TISR0:  MOV     #0,%0           ;PUT LINE # IN R0
011252  000167  174636                  JMP     TISR            ;GO TO COMMON INTERRUPT SERVICE

                000001                          N=N+1
                                                ISRT    \N
011256  012700  000001          TISR1:  MOV     #1,%0           ;PUT LINE # IN R0
011262  000167  174626                  JMP     TISR            ;GO TO COMMON INTERRUPT SERVICE

                000002                          N=N+1
                                                ISRT    \N
011266  012700  000002          TISR2:  MOV     #2,%0           ;PUT LINE # IN R0
011272  000167  174616                  JMP     TISR            ;GO TO COMMON INTERRUPT SERVICE

                000003                          N=N+1
                                                ISRT    \N
011276  012700  000003          TISR3:  MOV     #3,%0           ;PUT LINE # IN R0
011302  000167  174606                  JMP     TISR            ;GO TO COMMON INTERRUPT SERVICE

                000004                          N=N+1
                                                ISRT    \N
011306  012700  000004          TISR4:  MOV     #4,%0           ;PUT LINE # IN R0
011312  000167  174576                  JMP     TISR            ;GO TO COMMON INTERRUPT SERVICE

                000005                          N=N+1
                                                ISRT    \N
011316  012700  000005          TISR5:  MOV     #5,%0           ;PUT LINE # IN R0
011322  000167  174566                  JMP     TISR            ;GO TO COMMON INTERRUPT SERVICE

                000006                          N=N+1
                                                ISRT    \N
011326  012700  000006          TISR6:  MOV     #6,%0           ;PUT LINE # IN R0
011332  000167  17455e                  JMP     TISR            ;GO TO COMMON INTERRUPT SERVICE

                000007                          N=N+1
                                                ISRT    \N
011336  012700  000007          TISR7:  MOV     #7,%0           ;PUT LINE # IN R0
011342  000167  174546                  JMP     TISR            ;GO TO COMMON INTERRUPT SERVICE

                000010                          N=N+1
                                                ISRT    \N
011346  012700  000010          TISR10: MOV     #10,%0          ;PUT LINE # IN R0
011352  000167  174536                  JMP     TISR            ;GO TO COMMON INTERRUPT SERVICE

                000011                          N=N+1
                                                ISRT    \N
011356  012700  000011          TISR11: MOV     #11,%0          ;PUT LINE # IN R0
011362  000167  174526                  JMP     TISR            ;GO TO COMMON INTERRUPT SERVICE

                000012                          N=N+1
```

```
                                        ISRT    \N
011366  012700  000012          TISR12: MOV     #12,%0          ;PUT LINE # IN R0
011372  000167  174516                  JMP     TISR            ;GO TO COMMON INTERRUPT SERVICE

        000013                          N=N+1
                                        ISRT    \N
011376  012700  000013          TISR13: MOV     #13,%0          ;PUT LINE # IN R0
011402  000167  174506                  JMP     TISR            ;GO TO COMMON INTERRUPT SERVICE

        000014                          N=N+1
                                        ISRT    \N
011406  012700  000014          TISR14: MOV     #14,%0          ;PUT LINE # IN R0
011412  000167  174476                  JMP     TISR            ;GO TO COMMON INTERRUPT SERVICE

        000015                          N=N+1
                                        ISRT    \N
011416  012700  000015          TISR15: MOV     #15,%0          ;PUT LINE # IN R0
011422  000167  174466                  JMP     TISR            ;GO TO COMMON INTERRUPT SERVICE

        000016                          N=N+1
                                        ISRT    \N
011426  012700  000016          TISR16: MOV     #16,%0          ;PUT LINE # IN R0
011432  000167  174456                  JMP     TISR            ;GO TO COMMON INTERRUPT SERVICE

        000017                          N=N+1
                                        ISRT    \N
011436  012700  000017          TISR17: MOV     #17,%0          ;PUT LINE # IN R0
011442  000167  174446                  JMP     TISR            ;GO TO COMMON INTERRUPT SERVICE

        000020                          N=N+1
                                        ISRT    \N
011446  012700  000020          TISR20: MOV     #20,%0          ;PUT LINE # IN R0
011452  000167  174436                  JMP     TISR            ;GO TO COMMON INTERRUPT SERVICE

        000021                          N=N+1
                                        ISRT    \N
011456  012700  000021          TISR21: MOV     #21,%0          ;PUT LINE # IN R0
011462  000167  174426                  JMP     TISR            ;GO TO COMMON INTERRUPT SERVICE

        000022                          N=N+1
                                        ISRT    \N
011466  012700  000022          TISR22: MOV     #22,%0          ;PUT LINE # IN R0
011472  000167  174416                  JMP     TISR            ;GO TO COMMON INTERRUPT SERVICE

        000023                          N=N+1
                                        ISRT    \N
011476  012700  000023          TISR23: MOV     #23,%0          ;PUT LINE # IN R0
011502  000167  174406                  JMP     TISR            ;GO TO COMMON INTERRUPT SERVICE

        000024                          N=N+1
                                        ISRT    \N
011506  012700  000024          TISR24: MOV     #24,%0          ;PUT LINE # IN R0
011512  000167  174376                  JMP     TISR            ;GO TO COMMON INTERRUPT SERVICE

        000025                          N=N+1
```

```
                                        ISRT    \N
011516  012700  000025          TISR25: MOV     #25,%0          ;PUT LINE # IN R0
011522  000167  174366                  JMP     TISR            ;GO TO COMMON INTERRUPT SERVICE

        000026                          N=N+1
                                        ISRT    \N
011526  012700  000026          TISR26: MOV     #26,%0          ;PUT LINE # IN R0
011532  000167  174356                  JMP     TISR            ;GO TO COMMON INTERRUPT SERVICE

        000027                          N=N+1
                                        ISRT    \N
011536  012700  000027          TISR27: MOV     #27,%0          ;PUT LINE # IN R0
011542  000167  174346                  JMP     TISR            ;GO TO COMMON INTERRUPT SERVICE

        000030                          N=N+1
                                        ISRT    \N
011546  012700  000030          TISR30: MOV     #30,%0          ;PUT LINE # IN R0
011552  000167  174336                  JMP     TISR            ;GO TO COMMON INTERRUPT SERVICE

        000031                          N=N+1
                                        ISRT    \N
011556  012700  000031          TISR31: MOV     #31,%0          ;PUT LINE # IN R0
011562  000167  174326                  JMP     TISR            ;GO TO COMMON INTERRUPT SERVICE

        000032                          N=N+1
                                        ISRT    \N
011566  012700  000032          TISR32: MOV     #32,%0          ;PUT LINE # IN R0
011572  000167  174316                  JMP     TISR            ;GO TO COMMON INTERRUPT SERVICE

        000033                          N=N+1
                                        ISRT    \N
011576  012700  000033          TISR33: MOV     #33,%0          ;PUT LINE # IN R0
011602  000167  174306                  JMP     TISR            ;GO TO COMMON INTERRUPT SERVICE

        000034                          N=N+1
                                        ISRT    \N
011606  012700  000034          TISR34: MOV     #34,%0          ;PUT LINE # IN R0
011612  000167  174276                  JMP     TISR            ;GO TO COMMON INTERRUPT SERVICE

        000035                          N=N+1
                                        ISRT    \N
011616  012700  000035          TISR35: MOV     #35,%0          ;PUT LINE # IN R0
011622  000167  174266                  JMP     TISR            ;GO TO COMMON INTERRUPT SERVICE

        000036                          N=N+1
                                        ISRT    \N
011626  012700  000036          TISR36: MOV     #36,%0          ;PUT LINE # IN R0
011632  000167  174256                  JMP     TISR            ;GO TO COMMON INTERRUPT SERVICE

        000037                          N=N+1
                                        ISRT    \N
011636  012700  000037          TISR37: MOV     #37,%0          ;PUT LINE # IN R0
011642  000167  174246                  JMP     TISR            ;GO TO COMMON INTERRUPT SERVICE

        000040                          N=N+1
```

```
                                        ;MESSAGES
011646  042045  030514  026461  MTITLE: .ASCII  !%DL11-E ON LINE TEST - MAINDEC-11-DZDLB-A%!
011654  020105  047117  046040
011662  047111  020105  042524
011670  052123  026440  046440
011676  044501  042116  041505
011704  030455  026461  055104
011712  046104  026502  022501
011720  046445  050101  047440          .ASCII  !%MAP OF DEVICES PRESENT%!
011726  020106  042504  044526
011734  042503  020123  051120
011742  051505  047105  022524
011750  046045  047111  020105          .ASCII  !%LINE  D-ADR     TRAP AT%@!
011756  042040  040455  051104
011764  020040  020040  052040
011772  040522  020120  052101
012000  040045
012002  020040  020040  020040  MLINE:  .ASCII  !      !
012010  020040  020040  020040  MDADR:  .ASCII  !          !
012016  020040  020040
012022  020040  020040  020040  MTRAP:  .ASCII  !      %@!
012030  040045
012032  047045  047117  020105  MNONE:  .ASCII  !%NONE FOUND%@!
012040  047506  047125  022504
012046     100
012047     045  042523  020124  MSWSEL: .ASCII  !%SET SR 0-2 TO SELECT PROGRAM NUMBER!
012054  051123  030040  031055
012062  052040  020117  042523
012070  042514  052103  050040
012076  047522  051107  046501
012104  047040  046525  042502
012112     122
012113     040  047101  020104          .ASCII  ! AND PRESS CONTINUE@!
012120  051120  051505  020123
012126  047503  052116  047111
012134  042525     100
012137     045  051105  047522  MTERR:  .ASCII  !%ERROR - UNEXPECTED TRAP!
012144  020122  020055  047125
012152  054105  042520  052103
012160  042105  052040  040522
012166     120
012167     045  051124  050101          .ASCII  !%TRAPPED TO  !
012174  042520  020104  047524
012202  020040
012204  020040  020040  020040  MTO:    .ASCII  !        !
012212  020040
012214  052045  040522  050120          .ASCII  !%TRAPPED FROM PC  !
012222  042105  043040  047522
012230  020115  041520  020040
012236  020040  020040  020040  MFROM:  .ASCII  !        @!
012244  020040     100
012247     040  020040  020040  CSRADD: .ASCII  !      @!
012254  040040
012256  043045  046101  042523  RINTM:  .ASCII  !%FALSE INT. RCVR@!
012264  044440  052116  020056
```

```
012272  041522  051126     100
012277     045  040506  051514  TINTM:  .ASCII  !%FALSE INT XMIT@!
012304  020105  047111  020124
012312  046530  052111     100
012317     045  041520  020075  EM0:    .ASCII  !%PC= !
012324  020040  020040  020040  APC:    .ASCII  !       @!
012332  020040     100
012335     040  052040  041530  ATXCSR: .ASCII  !  TXCSR = !
012342  051123  036440     040
012347     040  020040  020040  ATXWAS: .ASCII  !      @!
012354  040040
012356  020040  054122  051503  ARXCSR: .ASCII  !  RXCSR = !
012364  020122  020075
012370  020040  020040  020040  ARXWAS: .ASCII  !      @!
012376     100
012377     045  050045  043522  P0TIT:  .ASCII  !%%PRG0 - SINGLE CHAR LINE MODE TEST@!
012404  020060  020055  044523
012412  043516  042514  041440
012420  040510  020122  044514
012426  042516  046440  042117
012434  020105  042524  052123
012442     100
012443     045  050045  043522  P1TIT:  .ASCII  !%%PRG1 - SPEC BIN COUNT LINE MODE TEST@!
012450  020061  020055  050123
012456  041505  041040  047111
012464  041440  052517  052116
012472  046040  047111  020105
012500  047515  042504  052040
012506  051505  040124
012512  022445  051120  031107  P2TIT:  .ASCII  !%%PRG2 - SPECIAL MESSAGE LINE MODE TEST@!
012520  026440  051440  042520
012526  044503  046101  046440
012534  051505  040523  042507
012542  046040  047111  020105
012550  047515  042504  052040
012556  051505  040124
012562  022445  051120  031507  P3TIT:  .ASCII  !%%PRG3 - RECEIVE MESSAGE TEST@!
012570  026440  051040  041505
012576  044503  042520  046440
012604  051505  040523  042507
012612  052040  051505  040124
012620  022445  051120  032107  P4TIT:  .ASCII  !%%PRG4 - SPECIAL MESSAGE TEST (SPIRAL)@!
012626  026440  051440  042520
012634  044503  046101  046440
012642  051505  040523  042507
012650  052040  051505  020124
012656  051450  040520  040522
012664  024514     100
012667     045  051120  032507  P5TIT:  .ASCII  !%PRG5 - DATA ECHO TEST USING MAYNARD FACILITY@!
012674  026440  042040  052101
012702  020101  041505  047510
012710  052040  051505  020124
012716  051525  047111  020107
012724  040515  047131  051101
012732  020104  040506  044503
```

```
012740  044514  054524     100
012745     045  042523  020124  SELPAR: .ASCII  '%SET PARAMETERS IN SR AS FOLLOWS:'
012752  040520  040522  042515
012760  042524  051522  044440
012766  020116  051123  040440
012774  020123  047506  046114
013002  053517  035123
013006  051445  030522  040440          .ASCII  '%SR1 AND 0 = CHAR LENGTH%@'
013014  042116  030040  036440
013022  041440  040510  020122
013030  042514  043516  044124
013036  040045
013040  051445  052105  052040  SELCAR: .ASCII  '%SET TEST CHAR CODE IN SR7-SR0,@'
013046  051505  020124  044103
013054  051101  041440  042117
013062  020105  047111  051440
013070  033522  051455  030122
013076  040056
013100  046445  045501  020105  MAKCON: .ASCII  '%MAKE LINE CONNECTION,@'
013106  044514  042516  041440
013114  047117  042516  052103
013122  047511  027116     100
013127     040  040504  040524  CERDAT: .ASCII  ' DATA S/B: '
013134  051440  041057  020072
013142  020040  020040  053440  CSB:    .ASCII  '     WAS: '
013150  051501  020072
013154  020040  020040  041440  CWAS:   .ASCII  '     CHAR NO. '
013162  040510  020122  047516
013170  020056
013172  020040  020040     100  CRNUM:  .ASCII  '    @'
013177     007                  ENDPAS: .BYTE   007
013200     100                          .ASCII  '@'
013201     045  040077          AINPRG: .ASCII  '%?@'
013204  050045  051101  046501  PARMTS: .ASCII  '%PARAMETERS = '
013212  052105  051105  020123
013220  020075
013222  020040  040040          APARM:  .ASCII  '   @'
013226  041440  042514  051101  LINCHM: .ASCII  ' CLEAR TO SEND NOT SET,@'
013234  052040  020117  042523
013242  042116  047040  052117
013250  051440  052105  040056
013256  046045  047111  020105  LINMAD: .ASCII  '%LINE CONNECTION MADE,@'
013264  047503  047116  041505
013272  044524  047117  046440
013300  042101  027105     100
013305     045  047503  043116  ACONFIG:        .ASCII  '%CONFIGURATION # '
013312  043511  051125  052101
013320  047511  020116  020043
013326  020040  040040          TCONFIG:        .ASCII  '   @'
                                        .EVEN
013332     015     012          PRG2M:  .BYTE   015,012
013334  044124  020105  052521          .ASCII  'THE QUICK BROWN FOX JUMPED OVER THE LAZY DOGS BACK'
013342  041511  020113  051102
013350  053517  020116  047506
013356  020130  052512  050115
```

```
013364  042105  047440  042526
013372  020122  044124  020105
013400  040514  054532  042040
013406  043517  020123  040502
013414  045503
013416  030040  031061  032063          ,ASCII  ' 0123456789,%'
013424  033065  034067  027071
013432     045
013433     045  044514  042516  LFAIL:  ,ASCII  '%LINE FAILED%@'
013440  043040  044501  042514
013446  022504     100
013451     045  053117  051105  ROVER:  ,ASCII  '%OVERRUN, FRAME, OR PARITY ERROR%@'
013456  052522  026116  043040
013464  040522  042515  020054
013472  051117  050040  051101
013500  052111  020131  051105
013506  047522  022522     100
013513     045  044514  042516  ALINEX: ,ASCII  '%LINE # '
013520  021440     040
013523     040  020040  040527  TLINEX: ,ASCII  '   WAS SELECTED@'
013530  020123  042523  042514
013536  052103  042105     100
013543     045  044514  042516  ALINE:  ,ASCII  '%LINE # '
013550  021440     040
013553     040  020040  040527  TLINE:  ,ASCII  '   WAS CALLED'
013560  020123  040504  046124
013566  042505
013570  046045  040517  020104          ,ASCII  '%LOAD CONFIGURATION IS MM 0=1 S MODEM TYPE IN BRR'
013576  047503  042116  043511
013604  051125  052101  047514
013612  020116  047111  051440
013620  020122  025440  020063
013626  020046  047515  042504
013634  020115  054523  042520
013642  044440  020116  051123
013650     042
013651     045  030060  032061          ,ASCII  ' 0%(X, (%@'
013656  026063  030040  031075
013664  051040     111
013667     045  047124  042101  KRU:    ,ASCII  '%LOAD BRU-BOOT LINE YOU ARE DIALING IN@'
013674  051440  050122  020055
013702  052075  020123  044514
013710  042516  020040  052517
013716  040440  042522  023040
013724  040511  044514  043516
013732  047440  040116
013736  050445  052517  041440  UR:     ASCII  '%YOU CALLED FROM LINE #
013744  046101  042514  020104
013752  051106  046517  044040
013760  047111  020105  020043
013766  020040     100          URA:    ,ASCII  '  @'
013771     045  051120  051505  BUTTON: ,ASCII  '%PRESS DATA BUTTON ON DATA PHONE@'
013776  020123  040504  040524
014004  041040  052125  047524
014012  020116  047117  042040
```

```
014020  052101  020101  044120
014026  047117  040105
014032  046045  040517  020104  LDLINE: .ASCII  !%LOAD LINE NO.IN SR 3-7@!
014040  044514  042516  047040
014046  027117  047111  051440
014054  020122  026463  040067
014062  051045  041505  053117  MPWRF:  .ASCII  !%RECOVERED FROM POWER FAILURE@!
014070  051105  042105  043040
014076  047522  020115  047520
014104  042527  020122  040506
014112  046111  051125  040105
014120  044445  046114  043505  MMODX:  .ASCII  !%ILLEGAL LINE NO.@!
014126  046101  046040  047111
014134  020105  047516  040056
014142  044445  046114  043505  MMODD:  .ASCII  !%ILLEGAL DEVICE ADDRESS@!
014150  046101  042040  053105
014156  041511  020105  042101
014164  051104  051505  040123
014172  051445  052105  051440  MMOD1:  .ASCII  !%SET SR 0-5 TO LINE NUMBER OF DEVICE ADDRESS TO BE!
014200  020122  026460  020065
014206  047524  046040  047111
014214  020105  052516  041115
014222  051105  047440  020106
014230  042504  044526  042503
014236  040440  042104  042522
014244  051523  052040  020117
014252  042502
014254  046440  042117  043111          .ASCII  ! MODIFIED,% THEN PRESS CONTINUE@!
014262  042511  026104  020045
014270  044124  047105  050040
014276  042522  051523  041440
014304  047117  044524  052516
014312  040105
014314  051445  052105  051440  MMOD2:  .ASCII  !%SET SR 0-15 TO NEW RXCSR DEVICE ADDRESS!
014322  020122  026460  032461
014330  052040  020117  042516
014336  020127  054122  051503
014344  020122  042504  044526
014352  042503  040440  042104
014360  042522  051523
014364  020054  044124  047105          .ASCII  !, THEN PRESS CONTINUE,@!
014372  050040  042522  051523
014400  041440  047117  044524
014406  052516  027105     100
014413     045  042523  020124  MMOD3:  .ASCII  !%SET SR TO ALL ONES AND PRESS CONTINUE TO CHANGE ANOTHER!
014420  051123  052040  020117
014426  046101  020114  047117
014434  051505  040440  042116
014442  050040  042522  051523
014450  041440  047117  044524
014456  052516  020105  047524
014464  041440  040510  043516
014472  020105  047101  052117
014500  042510     122
014503     040  042504  044526          .ASCII  ! DEVICE ADDRESS@!
```

```
014510  042503  040440  042104
014516  042522  051523     100
        014524                          .EVEN
014524  000000                  OUTBUF: OPEN
        016474                          .=OUTBUF+1000.
016474  000000                  INBUF:  OPEN
        020444                          .=INBUF+1000.
        014670                          BUFF=OUTBUF+100.
        000001                  DEND:   .END
```

```
014020  052101  020101  044120
014026  047117  040105
014032  046045  040517  020104  LDLINE: ,ASCII  !%LOAD LINE NO,IN SR 3-7@!
014040  044514  042516  047040
014046  027117  047111  051440
014054  020122  026463  040067
014062  051045  041505  053117  MPWRF:  ,ASCII  !%RECOVERED FROM POWER FAILURE@!
014070  051105  042105  043040
014076  047522  020115  047520
014104  042527  020122  040506
014112  046111  051125  040105
014120  044445  046114  043505  MMODX:  ,ASCII  !%ILLEGAL LINE NO,@!
014126  046101  046040  047111
014134  020105  047516  040056
014142  044445  046114  043505  MMODD:  ,ASCII  !%ILLEGAL DEVICE ADDRESS@!
014150  046101  042040  053105
014156  041511  020105  042101
014164  051104  051505  040123
014172  051445  052105  051440  MMOD1:  ,ASCII  !%SET SR 0-5 TO LINE NUMBER OF DEVICE ADDRESS TO BE!
014200  020122  026460  020065
014206  047524  046040  047111
014214  020105  052516  041115
014222  051105  047440  020106
014230  042504  044526  042503
014236  040440  042104  042522
014244  051523  052040  020117
014252  042502
014254  046440  042117  043111          ,ASCII  ! MODIFIED,% THEN PRESS CONTINUE@!
014262  042511  026104  020045
014270  044124  047105  050040
014276  042522  051523  041440
014304  047117  044524  052516
014312  040105
014314  051445  052105  051440  MMOD2:  ,ASCII  !%SET SR 0-15 TO NEW RXCSR DEVICE ADDRESS!
014322  020122  026460  032461
014330  052040  020117  042516
014336  020127  054122  051503
014344  020122  042504  044526
014352  042503  040440  042104
014360  042522  051523
014364  020054  044124  047105          ,ASCII  !, THEN PRESS CONTINUE,@!
014372  050040  042522  051523
014400  041440  047117  046524
014406  052516  027105     100
014413     045  042523  020124  MMOD3:  ,ASCII  !%SET SR TO ALL ONES AND PRESS CONTINUE TO CHANGE ANOTHER!
014420  051123  052040  020117
014426  046101  020114  047117
014434  051505  040440  042116
014442  050040  042522  051523
014450  041440  047117  044524
014456  052516  020105  047524
014464  041440  040510  043516
014472  020105  047101  052117
014500  042510     122
014503     040  042504  044526          ,ASCII  ! DEVICE ADDRESS@!
```

```
014510  042503  040440  042104
014516  042522  051523     100
        014524                          .EVEN
014524  000000                  OUTBUF: OPEN
        016474                          .=OUTBUF+1000.
016474  000000                  INBUF:  OPEN
        020444                          .=INBUF+1000.
        014670                          BUFF=OUTBUF+100.
        000001                  DEND:   .END
```

```
A       = 000037        ACONFI  013305        ADD1    003636        ADTENP  004214
AGAIN   003600          AINPRG  013201        ALINE   013543        ALINEX  013513
APARM   013222          APC     012324        ARXCSR  012356        ARXWAS  012370
ATXCSR  012335          ATXWAS  012347        BDCNV   004050        BDCNVA  004102
BDCNVB  004134          BDCNVC  004136        BDCNVD  004140        BIT0    = 000001
BIT1    = 000002        BIT10   = 002000      BIT11   = 004000      BIT12   = 010000
BIT13   = 020000        BIT14   = 040000      BIT15   = 100000      BIT2    = 000004
BIT3    = 000010        BIT4    = 000020      BIT5    = 000040      BIT6    = 000100
BIT7    = 000200        BIT8    = 000400      BIT9    = 001000      BMOVA   004036
BMOVE   004026          BUFF    = 014670      BUFFP   001400        BUTTON  013771
CALLED  001404          CALLER  001402        CARMSK  001362        CERDAT  013127
CHALT   = 104005        CHLT    002372        CNVCTR  004206        COLMN   007506
CONFIG  001332          CONN    006104        COUNT   001324        CRNUM   013172
CRXTX   002756          CRXTXA  003030        CRXTXB  003032        CRXTXC  003036
CSB     013142          CSRADD  012247        CTRD    001364        CWAS    013154
DATCHK  = 104004        DCERR   005364        DECVAL  004226        DELAY   = 104016
DEND    020444          DIGIT   004210        DISCON  006070        DLCNT   003360
DLY     003320          DLYA    003336        DLYB    003342        DLYC    003354
DOIT    003574          DONE    003630        DTCHK   002416        DTCHKA  002514
EHALT   = 104010        EHLT    002404        EHLTA   002414        EIGHT   003464
EMTA    002240          EMTINT  002226        EMTTAB  001264        EMO     012317
ENDPAS  013177          ERR     002516        ERRA    002566        ERRB    002630
ERRC    002636          ERRCNT  007750        ERRD    002646        ERRE    002650
ERROR   = 104003        ERROR1  = 104013      ERRRX   = 104015      ERRTX   = 104014
ERR1    002540          ERR3A   007064        ERR3B   007100        ERR3C   007106
ERTP    004352          ERTPA   004422        FILL    004000        FILLA   004006
FINISH  005330          FIVE    003552        FMAP    001350        FNONE   001346
FORMAD  004536          FROMPC  001342        FTITLE  001344        GENPAR  003432
INBUF   016474          INBUFP  001376        INCPRG  002360        INFIL   003774
LDLINE  014032          LDPRI   010130        LDPRIA  010144        LDPRIX  010160
LDTVEC  010062          LDTVED  010102        LDVECB  010036        LDVECS  010016
LDVEC1  010050          LDVEC2  010116        LFAIL   013433        LINCA   004612
LINCB   004630          LINCF   004710        LINCHM  013226        LINCON  004574
LINE    001330          LINEND  001354        LINEUP  004726        LINMAD  013256
LINSA   003710          LINSEL  003646        MACHER  000004        MAKCON  013100
MANUAL  = 100000        MAPA    001520        MAPEND  001730        MAPERR  001752
MAPNE   001550          MAPOK   001560        MAPOKA  001672        MAPVEC  004460
MDADR   012010          MFROM   012236        MLINE   012002        MMODD   014142
MMODX   014120          MMOD1   014172        MMOD2   014314        MMOD3   014413
MNONE   012032          MODEM   001412        MODEV   002024        MODEV1  002036
MODEV2  002074          MODEV3  002120        MOVIT   007752        MOVITA  007772
MPWRF   014062          MSWSEL  012047        MTERR   012137        MTITLE  011646
MTO     012204          MTRAP   012022        N       = 000040      NUMBER  001334
OACNV   003362          OACNVA  003374        OLDPS   001336        OPEN    = 000000
OTBUFP  001406          OUTBUF  014524        OVRLAY  004730        OVRLYA  004740
PARBIT  001322          PAREX   004330        PARMTS  013204        PFAIL   002652
POPSP   = 005726        POPSP2  = 022626      PRGID   001242        PRGNUM  001240
PRGTAB  001244          PRG0    006260        PRG0A   006370        PRG1    006374
PRG1C   006472          PRG2    006476        PRG2A   006520        PRG2B   006524
PRG2C   006530          PRG2M   013332        PRG3    006574        PRG3A   006610
PRG3EX  007316          PRG4    007330        PRG4A   007364        PRG4B   007374
PRG4C   007376          PRG4D   007414        PRG5    007542        PRG5A   007566
PRG5AA  007610          PRG5B   007616        PRG5BB  007626        PRG5C   007632
PRG5D   007732          PRG5E   007742        PRTY0   = 000000      PRTY1   = 000040
PRTY2   = 000100        PRTY3   = 000140      PRTY4   = 000200      PRTY5   = 000240
```

```
PRTY6  = 000300        PRTY7  = 000340        PSW    = 177776        PWRUP   002662
P0TIT    012377        P1TIT    012443        P2TIT    012512        P3TIT   012562
P4TIT    012620        P5TIT    012667        RBUF     010364        RCSR    010266
RECDAT   001356        REMAP    001416        RESTRT   002702        RINTM   012256
RINT3    006712        RINT3A   006774        RINT3B   007026        RINT3E  007114
RISR     004756        RISRA    005016        RISRAA   005040        RISRB   005064
RISRBB   005132        RISRC    005142        RISRCA   005176        RISRD   005230
RISRDA   005250        RISREX   005452        RISRF    005400        RISRFB  005570
RISRFC   005634        RISRFD   005744        RISRFE   006006        RISRFF  005760
RISRFG   006020        RISRFH   006036        RISR0    010656        RISR1   010666
RISR10   010756        RISR11   010766        RISR12   010776        RISR13  011006
RISR14   011016        RISR15   011026        RISR16   011036        RISR17  011046
RISR2    010676        RISR20   011056        RISR21   011066        RISR22  011076
RISR23   011106        RISR24   011116        RISR25   011126        RISR26  011136
RISR27   011146        RISR3    010706        RISR30   011156        RISR31  011166
RISR32   011176        RISR33   011206        RISR34   011216        RISR35  011226
RISR36   011236        RISR4    010716        RISR5    010726        RISR6   010736
RISR7    010746        ROVER    013451        RSTPC    002354        RSTPSW  002356
RSTREG = 104012        RSTRG    002320        RTN      003604        RXBUF   001202
RXBUFT   007326        RXCSR    001200        RXCSRT   001370        RXERR   002736
RXLVL    001212        RXVTR    001210        SAVE     001326        SAVREG = 104011
SAVRG    002260        SAVR0    003316        SELCAR   013040        SELPAR  012745
SETPAR   004234        SEVEN    003530        SIX      003506        SR     = 177570
SRT      001374        STALL  = 104002        START    001422        START1  001770
STKPTR = 001200        STPARA   004332        STPPA    003114        STPRA   003064
STRVRV   003046        STRXV  = 104006        STTXV  = 104007        STXMTV  003076
SUBTEN   004146        SUBTNA   004152        SUBTNB   004166        SVRPC   002314
SVRPSW   002316        TBIT1    004266        TBUF     010560        TBUFFP  001410
TCONFI   013326        TCRLF    007510        TCSR     010462        TEMP    001372
TEMP1    001352        TENPWR   004212        TFLAG    007322        TINTM   012277
TINT3    007124        TINT3B   007174        TINT3C   007236        TISR    006114
TISRA    006132        TISRAA   006130        TISRB    006240        TISRBB  006230
TISRC    006200        TISR0    011246        TISR1    011256        TISR10  011346
TISR11   011356        TISR12   011366        TISR13   011376        TISR14  011406
TISR15   011416        TISR16   011426        TISR17   011436        TISR2   011266
TISR20   011446        TISR21   011456        TISR22   011466        TISR23  011476
TISR24   011506        TISR25   011516        TISR26   011526        TISR27  011536
TISR3    011276        TISR30   011546        TISR31   011556        TISR32  011566
TISR33   011576        TISR34   011606        TISR35   011616        TISR36  011626
TISR37   011636        TISR4    011306        TISR5    011316        TISR6   011326
TISR7    011336        TKB      001222        TKLVL    001232        TKS     001220
TKVTR    001230        TLINE    013553        TLINEX   013523        TOPC    001340
TPB      001226        TPINT    007256        TPINTA   007276        TPLVL   001236
TPS      001224        TPVTR    001234        TXBUF    001206        TXCSR   001204
TXCSRT   001366        TXERR    002714        TXLVL    001216        TXVTR   001214
TYP      003126        TYPA     003142        TYPC     003164        TYPD    003202
TYPDAT   003246        TYPE   = 104000        TYPED  = 104001        TYPF    003220
TYPS     003250        TYPSA    003304        TYPSAA   003254        TYPSB   003312
UR       013736        URA      013766        VECTAB   010170        WORDS   007324
WRU      013667        XMTDAT   001360        .      = 020444
```

ERRORS DETECTED: 0

```
RUN-TIME:  37 SECONDS
CORE USED:  7K
```